TOKYO SUMMIT-2

2nd International Conference on Innovative Studies of Contemporary Sciences

August 17-19, 2020 Tokyo Japan

The Book of Full Texts

Applied Sciences

Edited by
Dr. Dr. Froilan D. Mobo
Zhuldyz SAKHI

ISBN 978-625-7139-21-2

TOKYO SUMMIT-II

II. INTERNATIONAL CONFERENCE ON INNOVATIVE STUDIES OF CONTEMPORARY SCIENCES

August 17-19, 2020,
Tokyo, JAPAN

The Book of Full Texts

Social Sciences & Humanities

Edited by
Dr. Froilan D. Mobo
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FULL TEXTS

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Dr. Dr. Froilan D. Mobo
Zhuldyz SAKHI

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Issued:29.08.2020

CONFERENCE ID

- **TOKYO SUMMIT**

2ND INTERNATIONAL CONFERENCE ON INNOVATIVE STUDIES OF CONTEMPORARY SCIENCES

- **Keynote & Invited participation type**
- **DATE - PLACE**

August 17-19, 2020,
Tokyo, JAPAN

- **COORDINATOR**

Zhuldyz SAKHI

- **LANGUAGES**

English, Japanese, Turkish

- **INTERNATIONAL PARTICIPANTS**

Saudi Arabia, Iraq, Thailand, Japan, USA, Indonesia, Turkey, Bangladesh, Azerbaijan, India, Pakistan, Kazakhstan, Philippines, Greece, Nigeria, Kuwait, Taiwan

- **NUMBER OF ACCEPTED PAPERS**

224

- **NUMBER OF REJECTED PAPERS**

30

- **EVALUATION PROCESS**

All applications have undergone a double-blind peer review process

- **PRESENTATION**

Oral Presentation / Virtual Presentation

SCIENCE & REVIEW COMMITTEE

Prof. Dr. Mustafa TALAS, Omerhalisdemir University
Assoc. Prof. Dr. Sehrana KASIMİ, Azerbaijan MEA
Assoc. Prof. Dr. Sevcan YILDIZ, Akdeniz University
Dr. Luna Moni DAS, Vasanta College for Women
Assoc. Prof. Dr. Froilan D. Mobo, Philippine Merchant Marine Academy
Assoc. Prof. Dr. Aparna Srivastava, Noida International University
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Dr. Yicheng WU, Minzu University
Dr. MACHUNWANGLIU KAMEI, University of the People, California
Dr. Zhi Huan MENCHUANG, Renmin University
Cengiz TOPDEMIR, Awarded Mathematician
Kanokwan Somwong, Chiang Mai University
Janaka Wijesinghe, Uva Wellassa University

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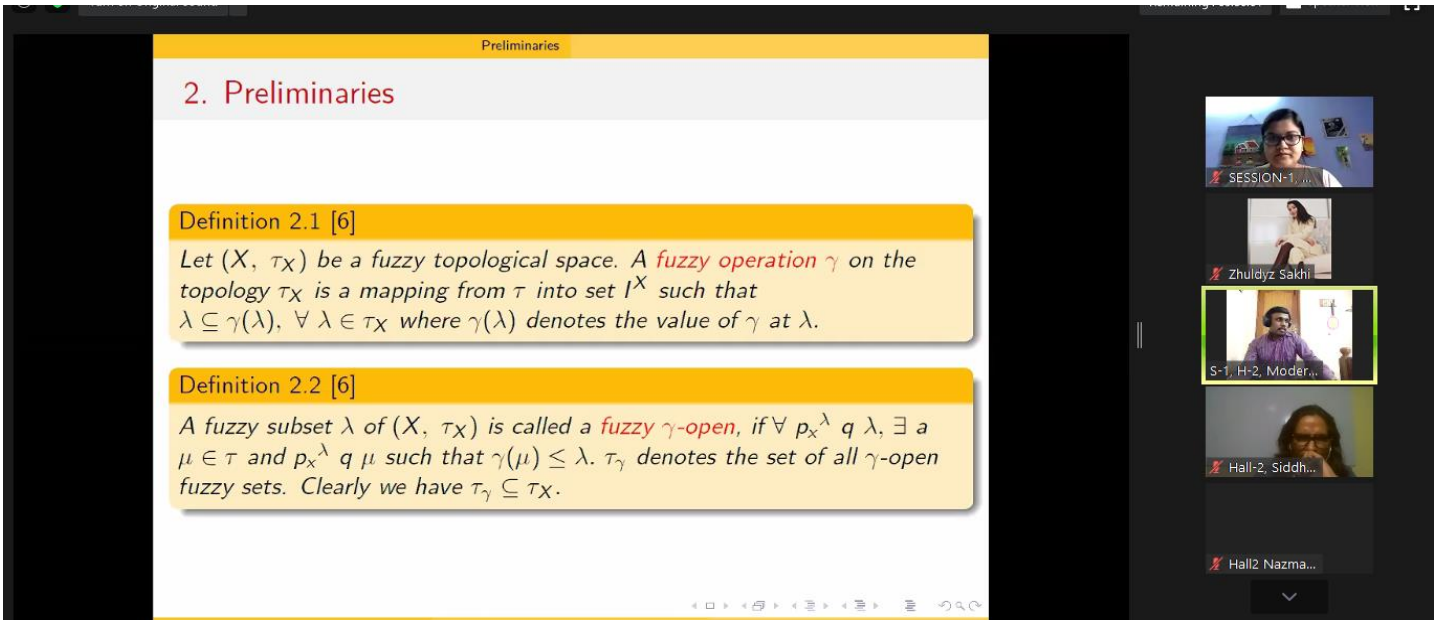
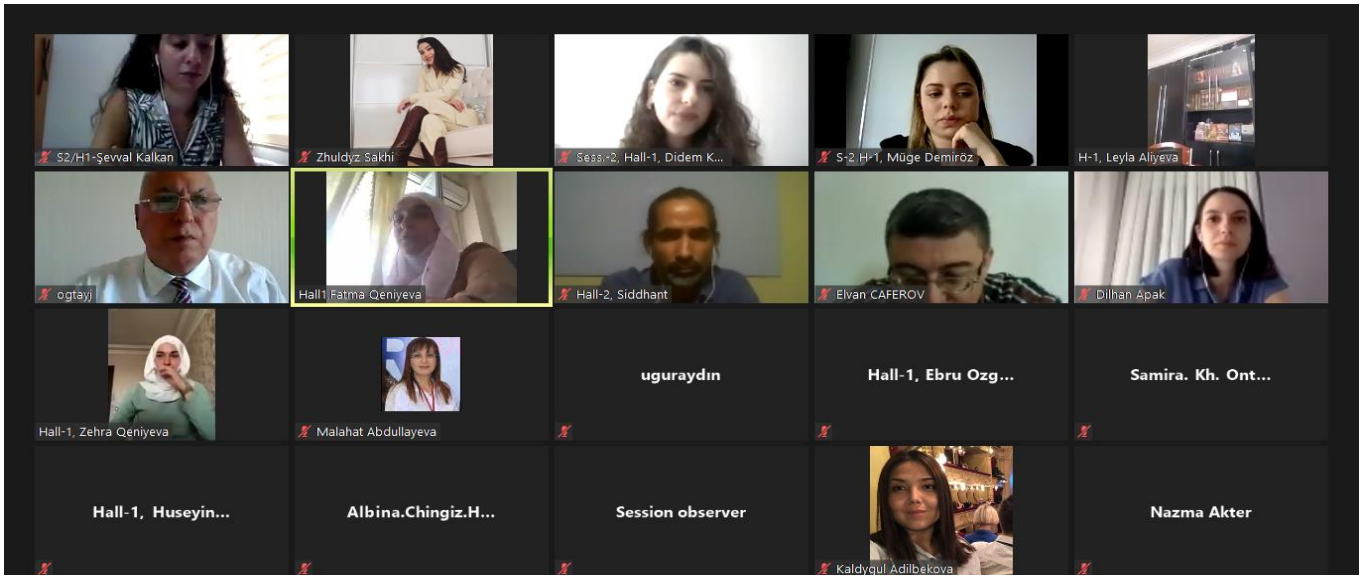
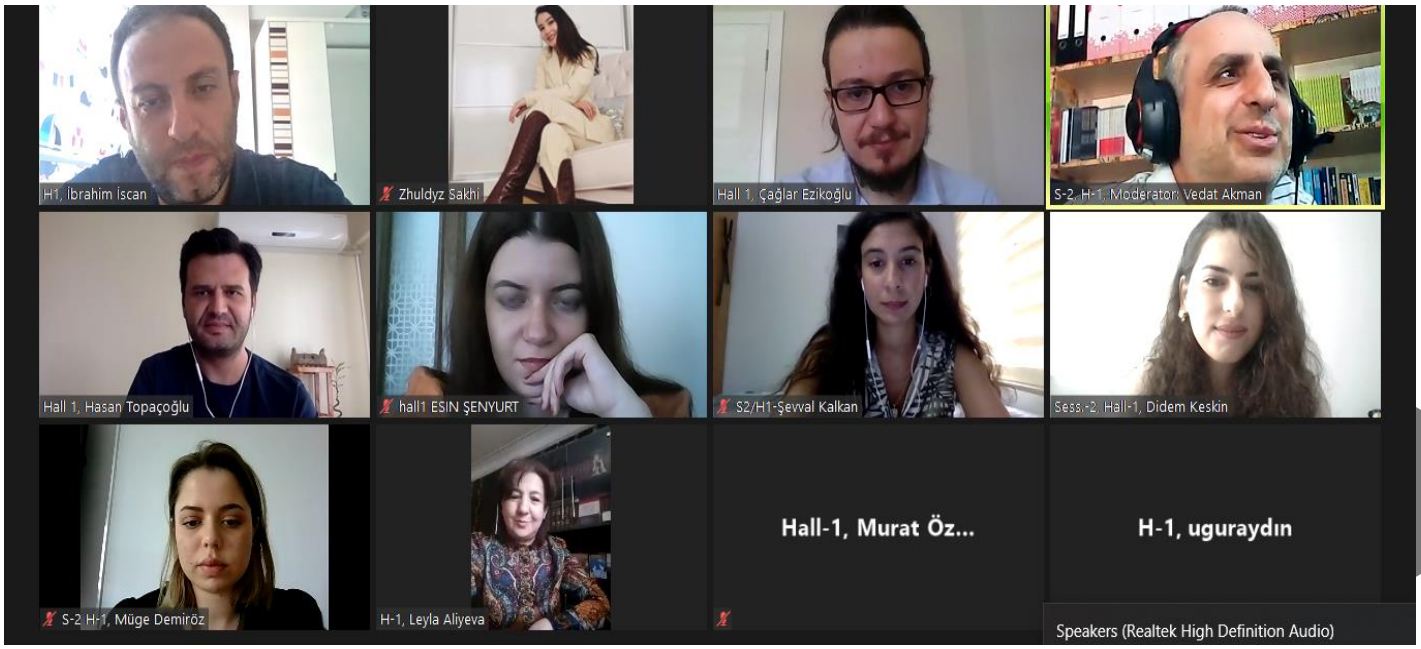
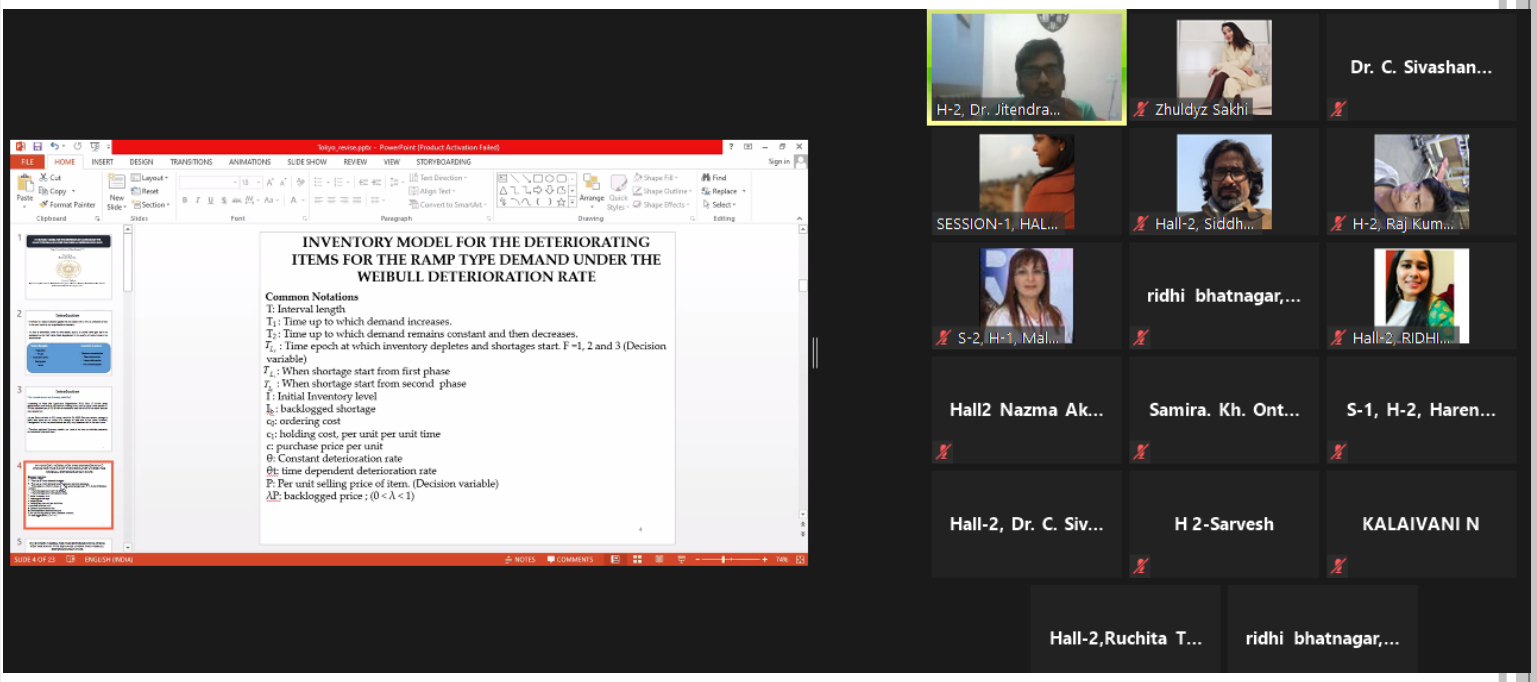
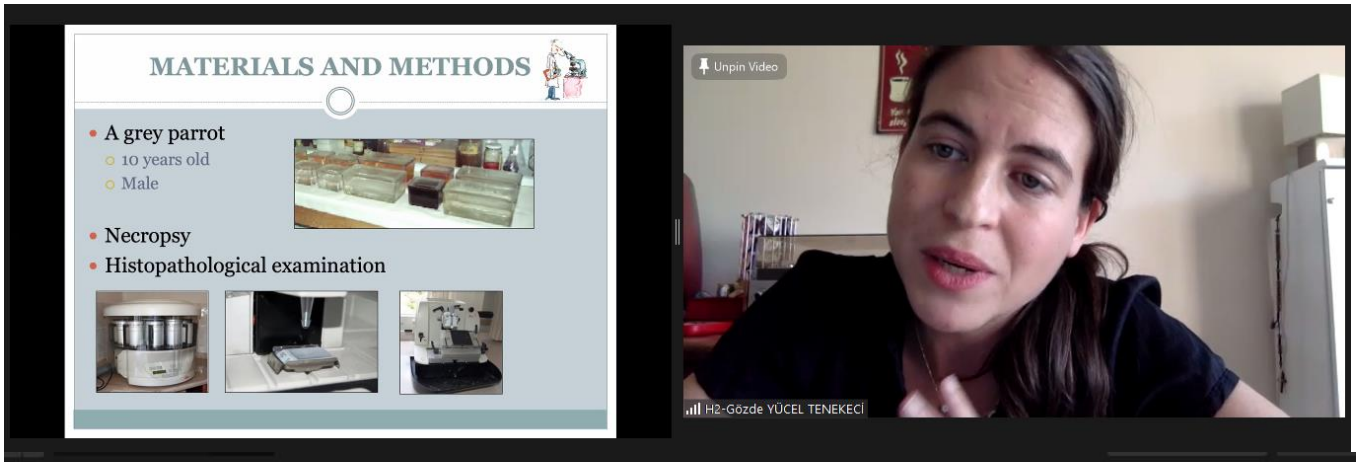
PRESENTATION GALLERY











RESULT

The researcher used the extraction procedure of the Principal Component with Varimax rotation to perform EFA technique on construct items of the study.

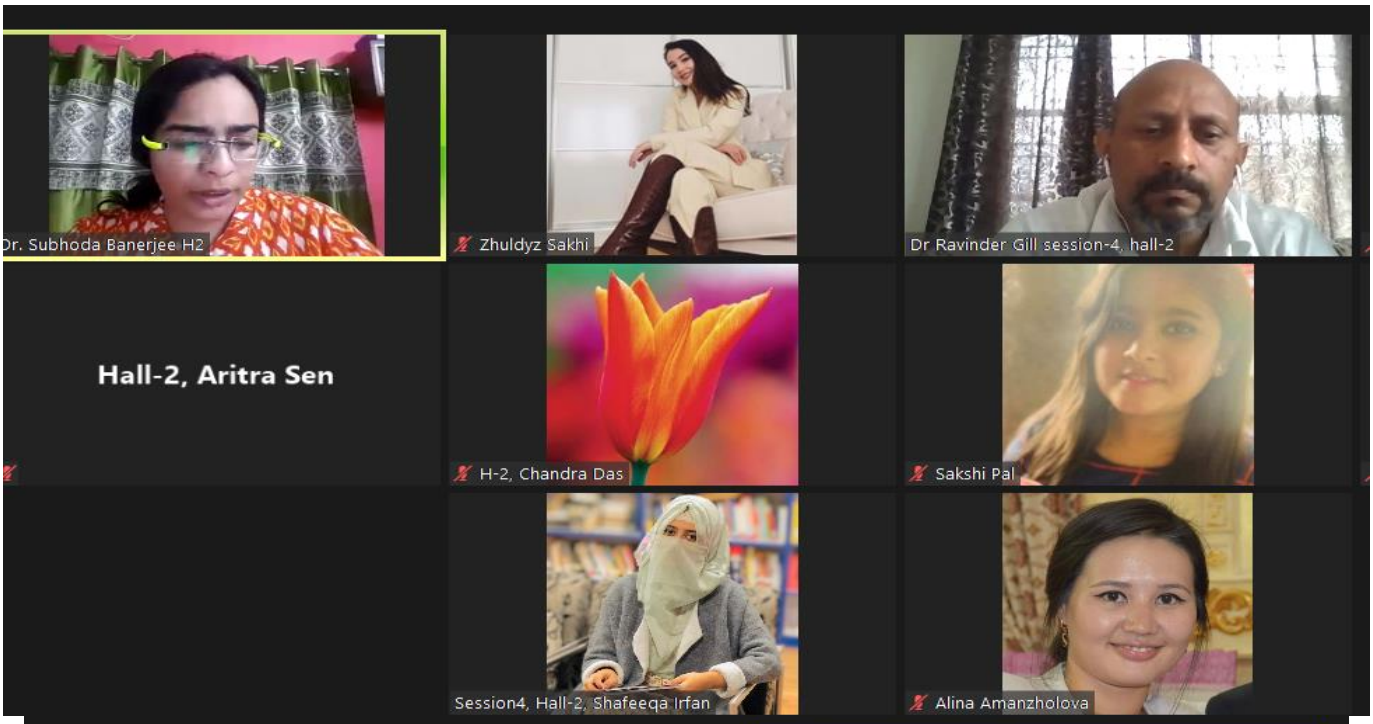
The result of the Bartlett's Sphericity Test was highly significant (sig. 000).

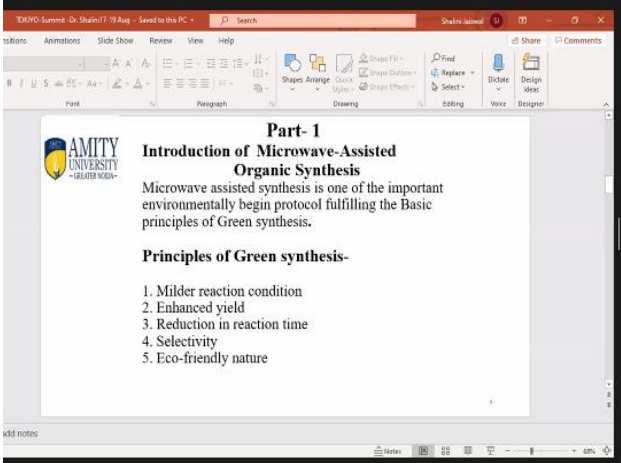
KMO result was impressive; its is above the minimum threshold of 0.5.

Result of the Bartletts' Test of sphericity and KMO indicated the suitability of the data to continue with the data reduction process in EFA

Table 2: KMO and Bartlett's Test

) and Bartlett's Test		
O Measure of Sampling Adequacy.		.726
ett's Test of Sphericity	Approx. Chi-Square	206.512

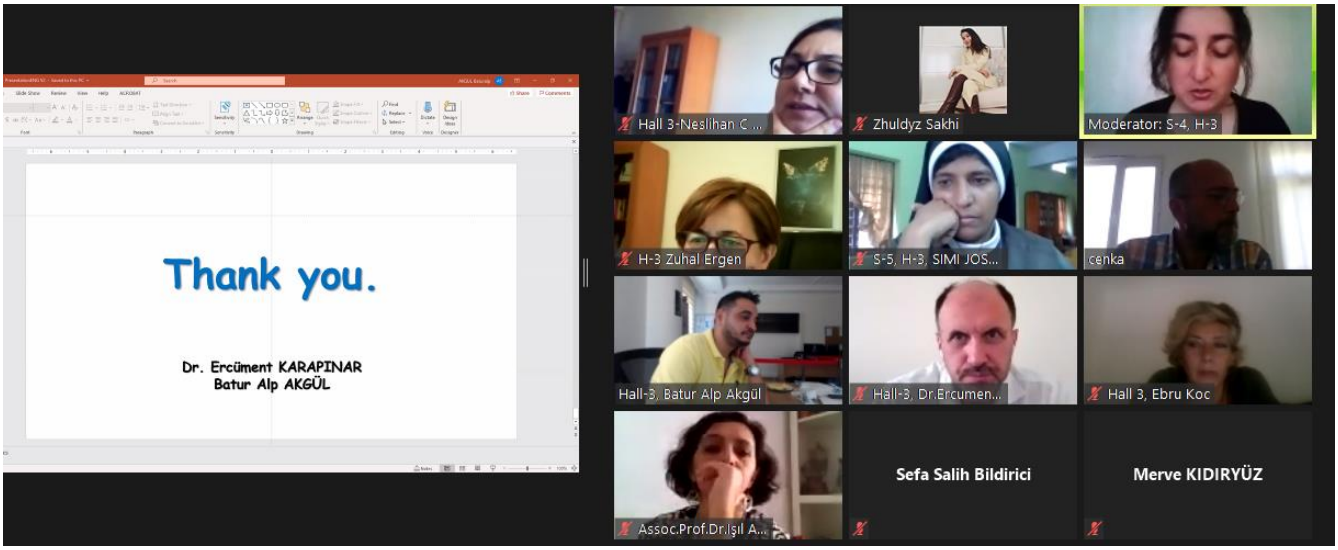

Dr. Subhoda Banerjee H2
Zhuldyz Sakhi
Dr Ravinder Gill session-4, hall-2
Hall-2, Aritra Sen
H-2, Chandra Das
Sakshi Pal
Session4, Hall-2, Shafeeqa Irfan
Alina Amanzholova

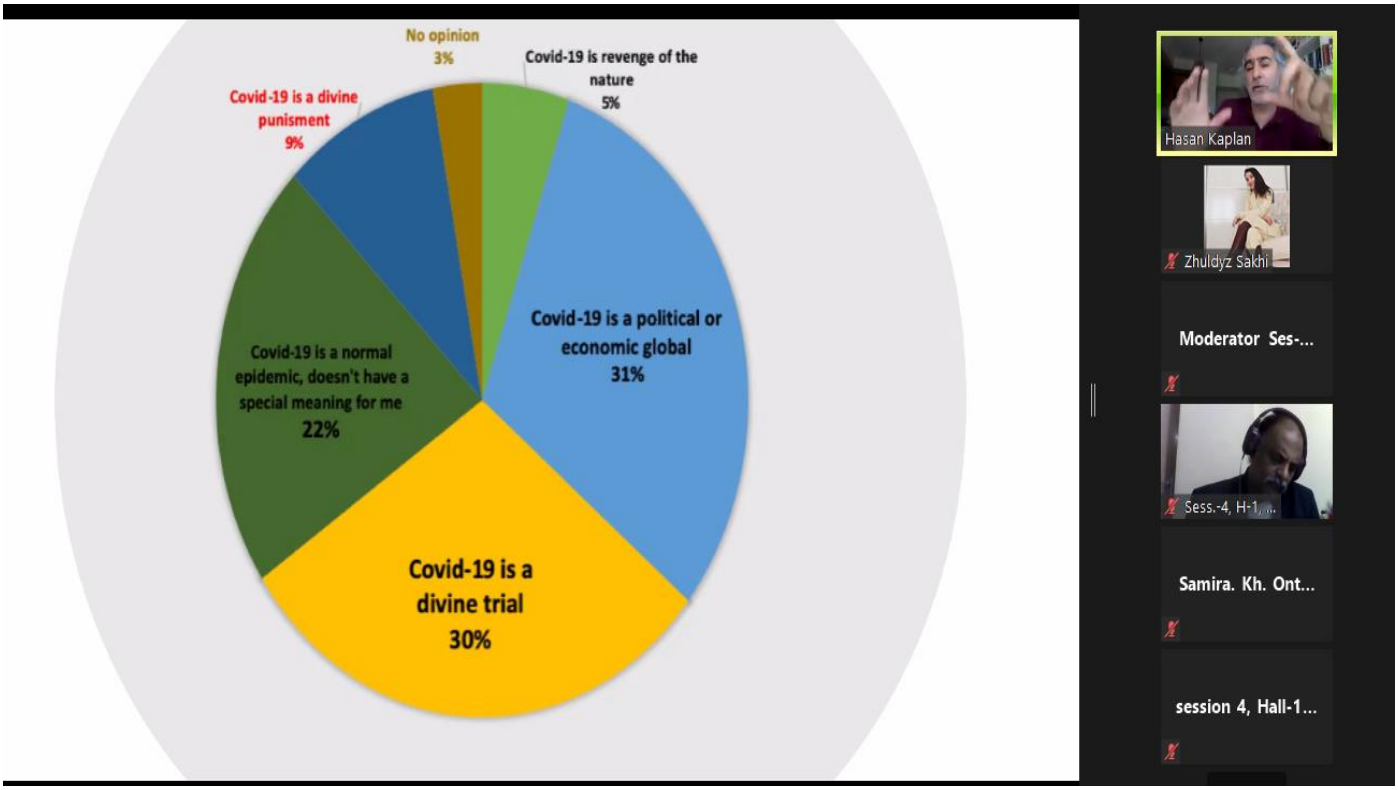

Part- 1
Introduction of Microwave-Assisted Organic Synthesis
Microwave assisted synthesis is one of the important environmentally begin protocol fulfilling the Basic principles of Green synthesis.
Principles of Green synthesis-
1. Milder reaction condition
2. Enhanced yield
3. Reduction in reaction time
4. Selectivity
5. Eco-friendly nature

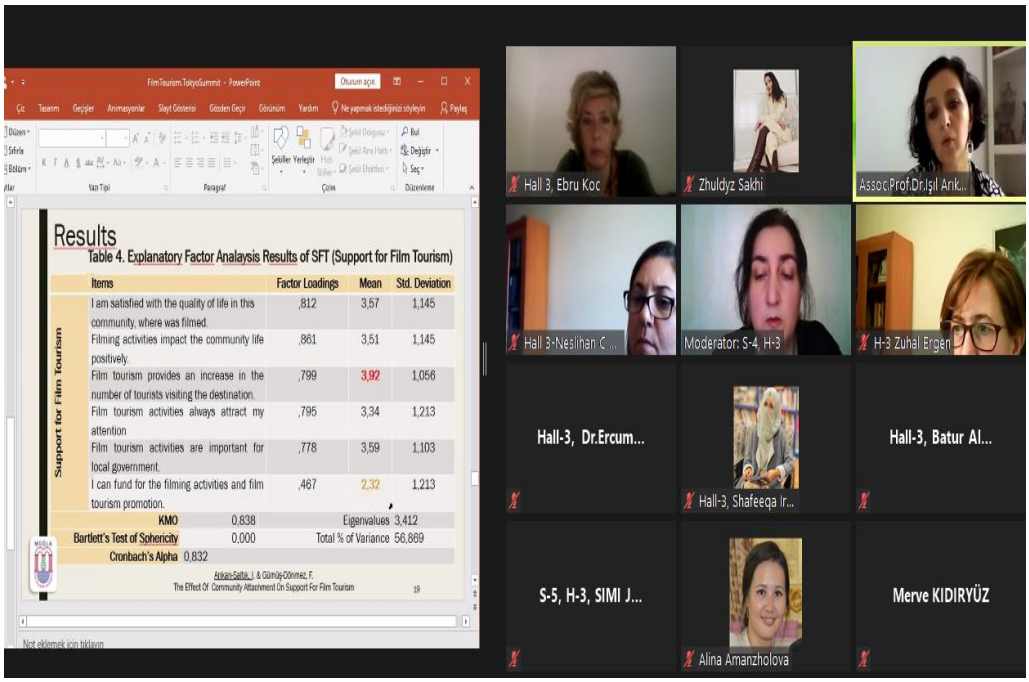

Moderator: Sess.-3, Hall-2 Dr. Shalini Jaiswal


Ask to Unmute
Assoc.Prof.Dr.Isil Arikan Saltik, Hall3


IMPACT OF COVID - 19 PANDEMIC ON INDIAN AND CHINESE ECONOMY: A COMPARATIVE STUDY
H-1, Moderator...
Zhuldyz Sakhi
HALL 1- JAYASH...
Hall-1, R Thi...
S-2, H-1, PJ...


Thank you.
Dr. Ercüment KARAPINAR
Batur Alp AKGÜL
Hall 3-Neslihan C ...
Zhuldyz Sakhi
Moderator: S-4, H-3
H-3 Zuhal Ergen
S-5, H-3, SIMI JOS...
çenka
Hall-3, Batur Alp Akgül
Hall-3, Dr.Ercumen...
Hall 3, Ebru Koc
Assoc.Prof.Dr.Işıl A...
Sefa Salih Bildirici
Merve KIDIRYÜZ


No opinion 3%
Covid-19 is revenge of the nature 5%
Covid-19 is a divine punisment 9%
Covid-19 is a political or economic global 31%
Covid-19 is a normal epidemic, doesn't have a special meaning for me 22%
Covid-19 is a divine trial 30%
Hasan Kaplan
Zhuldyz Sakhi
Moderator Ses-...
Sess.-4, H-1, ...
Samira. Kh. Ont...
session 4, Hall-1...


Results
Table 4. Explanatory Factor Analaysis Results of SFT (Support for Film Tourism)
Items | Factor Loadings | Mean | Std. Deviation
Support for Film Tourism
I am satisfied with the quality of life in this community, where was filmed. ,812 3,57 1,145
Filming activities impact the community life positively. ,861 3,51 1,145
Film tourism provides an increase in the number of tourists visiting the destination. ,799 3,92 1,056
Film tourism activities always attract my attention ,795 3,34 1,213
Film tourism activities are important for local government. ,778 3,59 1,103
I can fund for the filming activities and film tourism promotion. ,467 2,32 1,213
KMO 0,838 Eigenvalues 3,412
Bartlett's Test of Sphericity 0,000 Total % of Variance 56,869
Cronbach's Alpha 0,832
Hall 3, Ebru Koc
Zhuldyz Sakhi
Assoc.Prof.Dr.Işıl Arık...
Hall 3-Neslihan C ...
Moderator: S-4, H-3
H-3 Zuhal Ergen
Hall-3, Dr.Ercum...
Hall-3, Shafeeqa Ir...
Hall-3, Batur Al...
S-5, H-3, SIMI J...
Alina Amanzholova
Merve KIDIRYÜZ


TOKYO SUMMIT


TOKYO SUMMIT
September 18-23, 2012
Tokyo, Japan
IKSAD
TOKYO SUMMIT
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Tokyo, Japan
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TOKYO SUMMIT


TOKYO SUMMIT
INTERNATIONAL CONGRESS
On Social Sciences, China to Adriatic - V
September 18-25, 2017
Tokyo - Japan

TOKYO SUMMIT-II

2nd international conference on innovative studies of contemporary sciences

August 17-19, 2020, Tokyo, JAPAN

CONGRESS PROGRAM

Online (with Video Conference) Presentation

Meeting ID: 729 064 4418
Passcode: 252525
ZOOM MEETING

August 18.2020- PRESENTATIONS

August 19.2020- PRESENTATIONS

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- The Zoom application is free and no need to create an account.
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- Moderator - responsible for the presentation and scientific discussion (question-answer) section of the session.

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  - You should be able to use screen sharing feature in Zoom.
- Attendance certificates will be sent to you as pdf at the end of the congress.
- Requests such as change of place and time will not be taken into consideration in the congress program.
- If you think there are any deficiencies / spelling mistakes in the program, please inform by e-mail until June 30, 2020 (17:00) at the latest.
- **(All speakers required to be connected to the session 15 min before the session starts)**
- Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.
- **Before you login to Zoom please indicate your name_surname and HALL number, exp. Hall 1, Alpaslan BOZKURT**

(All speakers required to be connected to the session **15 min before** the session starts)
Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

SESSION-1, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 14^{00}:16^{00}	MODERATOR - Dr. Soumitra Das
Authors	**Affiliation**	**Topic title**
Aman Kumar Rahul Gautam Rishi Pal Singh Anuj Kumar	Department of Physics, S. S. V. College, Hapur	STUDY OF STRUCTURAL, ELECTRONIC, MAGNETIC AND THERMODYNAMIC PROPERTIES OF REFESI [RE = ND AND LA] WITH HELP OF DENSITY FUNCTIONAL THEORY (DFT)
Dr. Soumitra Das	Institute of Technology, Pune, Maharashtra,India	INTERNET OF THINGS APPLICATION IN HEALTH CARE: WEARABLE FETUS MONITORING SYSTEM
Dr. Luna Moni Das, Assistant Professor,	Vasanta College for Women	CHANNEL DYNAMICS ALONG THE NORTHERN BANK OF THE UPPER BRAHMAPUTRA RIVER AND FORMATION OF A LARGER ISLAND WITH THE LOSS OF THE MAJULI ISLAND
Urfeya Mirza Shahnaz Anjum	University of Kashmir	TRANSRECTAL COLOR DOPPLER ULTRASONOGRAPHY IN CATTLE
Shahnaz Anjum Urfeya Mirza	University of Kashmir	CYANIDE AND THE HUMAN BODY
Irshad Ullah Aamna Saleem Khan	Education Department Government of Khyber Pakhtunkhwa Islamabad	CONTEMPORARY SCIENCES AND ITS USE IN CLASSROOM
Irshad Ullah Aamna Saleem Khan		HOW TO USE DIFFERENT INSTRUCTION MODEL IN CLASSROOM
Ridwan B. Marqas, Murat Karabatak Saman M. Almufti	Firat University Nawroz University	FIREBASE AND MYSQL PERFORMANCES FOR DATA EXCHANGING WITH CSV FILE IN PHP-BASED WEBSITE
HAYAT AHAMAD	Banaras Hindu University	SOCIAL DYNAMICS STATUS OF WOMEN IN ISLAM
CHANDAN PREET KOUR	Research scholar Central university of kashmir	IMPACT OF CHILD LABOUR ON EARLY CHILDHOOD EDUCATION AND LEARNING

SESSION-1, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 14^{00}:16^{00}	MODERATOR - Dr. C. Sivashanmugaraja
Authors	**Affiliation**	**Topic title**
Alka Singh	Banasthali Vidyapith, Banasthali, Rajasthan, India	NON-LINEAR CONSTRAINTS BASED CALIBRATION ESTIMATION USING TWO AUXILIARY VARIABLES IN SAMPLE SURVEY
Ridhima Nehra **Rojin Joseph** **Aparna Vyas**	Manav Rachna University India	COMPARISON OF IMAGE DENOISING USING WAVELET TRANSFORM AND WAVELET PACKET TRANSFORM
Aparna Vyas **Ridhi Bhatnagar**	Manav Rachna University, Faridabad, India	IMAGE PROCESSING USING MULTISCALE TRANSFORM: A REVIEW
N.Kalaivani **D.Saravanakumar**	Institute of Science and Technology	Characterizations of (,)y,a,b -generalized closed mappings in topological spaces
Ruchi Gupta **Harendra Jindal** **Sarvesh** **Raj Kumar** **Chhavi Baliyan**	Manav Rachna University Faredabad	A LITERATURE REVIEW OF LINEAR PROGRAMMING PROBLEMS : BASED ON CASE
Anurag Shukla **Ved Ratan** **U K Tripathi** **D R Singh** **R K Pathak** **Krishna Kumar**	C.S.A.U.A.T, Kanpur	DIVERSITY OF RHIZOCTONIA BATATICOLA & FUNGITOXIC EFFECT OF BOTANICALS ON GROWTH AND SURVIVAL OF SCLEROTIA
Dr. C. Sivashanmugaraja	Periyar Govt. Arts College	ON FUZZY CONTRA PRE-Γ-CONTINUOUS MAPPINGS IN FUZZY TOPOLOGICAL SPACES
Jitendra Kaushik **Ashish Sharma**	Institute of Applied sciences and Humanities, GLA University	INVENTORY MODEL FOR THE DETERIORATING FOR RAMP TYPE DEMAND UNDER THE WEIBULL DETERIORATION RATE
Ahmad Zuhdi, Sulur, Sumarjono, Aliyyatus Saadah	State University of Malang	DESIGNING OF CONTEXTUAL TEACHING AND LEARNING MATERIAL BASED ON GUIDED INQUIRY FOR VOCATIONAL HIGH SCHOOL

SESSION-2, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 16.00:18.00	MODERATOR Prof. Dr. Ogtay Jalilbayli
Authors	**Affiliation**	**Topic title**
Öğr.Gör.Dr.Bengütay Hayırsever Öğr.Gör.Uğur Aydın	Erciyes Üniversitesi	SEPET ÖRÜCÜLÜĞÜ VE GELENEKSEL SEPET ÖRÜCÜLÜĞÜNÜN DEVELİ'DEKİ SON TEMSİLCİSİ: TURAN MEHMET SÖBE
Şevval KALKAN	Istanbul Technical University	EVALUATION OF DARK TOURISM AREAS FOR CULTURAL LANDSCAPE COMPONENTS AND VISUAL LANDSCAPE QUALITY
Fatma Qəniyeva	Azerbaycan Milli Bilimler Akademisi	MODERN TOPLUMDA MISAFIRPERVERLIĞIN GELIŞIMINDE TEKNOLOJININ YERI VE ÖNEMI
Zəhra Qəniyeva	Azerbaycan Turizm ve Menecment Üniversitesi	ORTA ÇAĞ ISLAM KÜLTÜRÜNDE MÜSLÜMAN KADINLARININ YAŞAM TARZI
Albina Chingiz Heshimova	Azerbaijan Tourism and Management University	MAIN DETERMINANTS AND DEVELOPMENT TENDENCIES OF THE SERVICES MARKET IN AZERBAIJAN
Didem KESKİN Hüseyin GÜLER Ebru ÖZGÜR GÜLER	Çukurova Üniversitesi	CİNSİYET VE EĞİTİM DÜZEYİNİN GENEL İŞ TATMİNİ ÜZERİNDEKİ ETKİSİNİN META ANALİZİ İLE İNCELENMESİ
Müge Demiröz	Kocaeli University	POST STRUCTURALIST ANALYSIS OF ORANGES ARE NOT THE ONLY FRUIT
Prof. Dr. Ogtay Jalilbayli	Baku State University	SOME PECULIARITIES OF THE CAUSAL RELATIONS TRANSLATION (on the materials of Azerbaijani and Japanese languages)
Doç. Dr. Leyla Aliyeva	Bakü Slavyan Universitesi	BEDİİ TERCÜME VE KÜLTÜRLERARASI İLETİŞİM (Yaponca'dan Azerbaycan Türkçesi'ne tercüme materyalleri esasında)
Vildan BAYRAM	Istanbul Aydın University	BRANDING EFFORTS AND AN EXAMPLE OF APPLICATION: ANATOLIA JEWELRY
Dilhan APAK	Halic University	THE RISE OF ROBOT JOURNALISM AT MEDIA COMPANIES

SESSION-2, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 16.00:18.00	MODERATOR- Dr. Öğr. Üyesi H. Vedat AKMAN
Authors	**Affiliation**	**Topic title**
Dr. Öğr. Üyesi H. Vedat AKMAN	Beykent Üniversitesi	COVID -19 SONRASI DÜNYA EMTİA FIYATLARINDAKI GÜÇ KAYBI VE SALGIN SONRASI DÜNYA EMTIA PIYASALARI
Gülay Selvi Hanişoğlu Vedat Akman	Beykent Üniversitesi	DIGITALIZATION IN THE TURKISH BANKING SECTOR AND COVID-19
Hasan Topacoglu	Üsküdar University	TOWARDS 2023 : WHAT CAN TURKEY LEARN FROM JAPAN FOR ITS CENTENNIAL
Dr. Öğr. Üyesi Derya Fatma BİÇER Öğr. Gör. İbrahim İŞCAN	Sivas Cumhuriyet Üniversitesi	TÜKETİCİLERİN DİJİTAL BAĞIMLILIK DÜZEYLERİNİ DEĞERLENDİRMEYE YÖNELİK BİR ARAŞTIRMA
Dr.Çağlar Ezikoğlu	Çankırı Karatekin University	THE PRESIDENTIAL SYSTEM IN EASTERN EUROPEAN COUNTRIES IN POST- COMMUNIST ERA
Deniz Ertuğ Burcu Ertuğ	Athens Kapodistrian University MEF University	POLITICAL SALAFISM, THE CONCEPT OF JIHAD AND AL-QAIDA
Dr. Öğr. Üyesi Selin BİTİRİM OKMEYDAN	Ege Üniversitesi	TÜKETİCİLERİN E-TİCARET SİTELERİNDE YORUM YAZMA MOTİVASYONU ÜZERİNE NİCEL BİR ARAŞTIRMA
Öğr.Gör.Esra Akay TİRYAKİOĞLU Sümer Esin ŞENYURT Murat Özay TAŞKIN	Bartın University TED University	EFFECTS OF SYRIAN REFUGEES ON ECONOMIC AND SOCIAL LIFE IN TURKEY
Elmira Bogoviyeva Maya Katenova	DBA, PRM KIMEP University	WHAT DECISION BUSINESS STUDENTS CHOOSE IN A CASE SCENARIO ON BRIBING? THE CASE OF KAZAKHSTAN
Doç. Dr. Seriyye Gündoğdu	AMEA Şarkiyat Enstitüsü	İLK JAPON MÜSLÜMAN HACI ÖMER YAMAOKA`NIN HAC ZİYARETİ DÖNÜŞÜ İSTANBUL`DA KATILDIĞI TOPLANTILARIN SIRAT-I MÜSTAKİM DERGİSİNDE YANSIMALARI

SESSION-3, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 18^{00}:20^{00}	MODERATOR Prof. Dr. Hajar Huseynova
Authors	**Affiliation**	**Topic title**
Gulnar Yunusova	Azerbaijan National Academy of Sciences (ANAS)	THE IMPORTANCE OF THE TRANSLATION OF HARUKI MURAKAMI'S WORKS INTO AZERBAIJANI LANGUAGE
Doç. Dr. Kübra Kuliyeva	Azerbaycan Milli Bilimler Akademisi	KARAİMLER, KARAY VE AZERI DILLERI ARASINDA MÜVAZİLİK
Prof. Dr. Hajar Huseynova	Azerbaijan State Pedagogical University	JAPANESE AND AZERBAIJANI LANGUAGE RELATIONS
Doç.Dr. Gülşah GÜVELOĞLU	Recep Tayyip Erdoğan Üniversitesi	TRABZON İNGİLİZ KONSOLOSU VORLEY HARRİS'İN RAPORLARINA GÖRE 1950'Lİ YILLARDA RİZE
Res. Asst. Senem GÜRKAN	Ondokuz Mayıs University	ASSESSING MARRIAGES THROUGH THE VIEWS OF WOMEN WHO EXPERIENCED EARLY (CHILD) MARRIAGES
Mehtap DİNÇER	Burdur Mehmet Akif Ersoy Üniversitesi	THE HISTORICAL SOURCES OF MARI CITY
Dr. Öğretim Üyesi Selahattin YAKUT İdris YAKUT	Yozgat Bozok Üniversitesi	PANDEMİ SÜRECİNİN LİSE ÖĞRENCİLERİ ÜZERİNDEKİ PSİKOSOSYAL ETKİLERİNİN BAZI DEMOGRAFİK DEĞİŞKENLER AÇISINDAN İNCELENMESİ
Arş. Gör. Osman Kağan ERGÜR Dr. Halil Oğuzhan ERGÜR	Fırat Üniversitesi İnönü Üniversitesi	TÜRK VERGİ HUKUKUNDA SÜRELERİN UZAMASINA NEDEN OLAN DURUMLAR
Dr. Charu Dureja	Panjab University	NETIZEN'S AND UNCONTROLLED ACCESS TO CYBER TECHNOLOGIES DURING PANDEMIC
Hasan Ali GÜÇLÜ	Ufuk Üniversitesi	ÇOCUĞUN İHMAL VE İSTİSMARI

SESSION-3, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 18^{00}:20^{00}	MODERATOR- Assist. Prof. Dr. Kadir Öcalan
Authors	**Affiliation**	**Topic title**
Ayten GEÇMEZ Çetin GENÇER Aynur SEVİNÇ	Fırat Üniversitesi	GÜNEŞ ENERJI SANTRALI ÜRETIM VERILERININ METEOROLOJIK VERILERE BAĞLI OLARAK YAPAY ZEKA YÖNTEMLERI ILE TAHMINI
Merve KÜNİLİ İlknur AK	Çanakkale Onsekiz Mart University	INFLUENCE OF ULVA RIGIDA (ULVOPHYCEAE) AQUEOUS EXTRACTS ON THE GROWTH AND BIOCHEMICAL COMPOSITION OF TREPTACANTHA BARBATA (PHAEOPHYCEAE)
Assist. Prof. Dr. Kadir Öcalan	Necmettin Erbakan University	DIFFERENTIAL CROSS SECTION CALCULATIONS AT (N)NLO ACCURACY FOR THE W BOSON PLUS JET PRODUCTION IN PROTON-PROTON COLLISIONS AT 13 TEV
Arş. Gör. Aybike Üstündağ , Doç. Dr. Çetin Gencer	Munzur Üniversitesi Fırat Üniversitesi	PLC VE SCADA KULLANILARAK BİR ORCİK ÜRETİM SİSTEMİNİN OTOMASYONU
Burak Şentürken Assoc. Prof. Rukiye ERTAN	Coşkunöz Holding Company, Bursa Uludağ University,	INVESTIGATION OF RESISTANCE SPOT WELDABILITY OF TITANIUM ALLOY WITH ALUMINUM ALLOY
Nazlı Irmak GİRİTLİOĞLU		DETERMINING THE PATHOGENIC MISSENSE SINGLE NUCLEOTIDE POLYMORPHISMS OF GADD45B WITH IN SILICO APPROACH
Najma Barre Nur Farid Huseynov	Istanbul Aydin University Gebze Technical University	DETERMINANTS OF ENTREPRENEURIAL INTENTION AMONG ACADEMICIANS IN TURKEY
Mageshwaran Subramani Rajeshkumar Selvaraj Manoharan Ramamoorthy	School of Mechanical Engineering, Vellore Institute of Technology (VIT),	DYNAMIC CHARACTERIZATION STUDY OF CNT REINFORCED LAMINATED COMPOSITE DOUBLY CURVED SANDWICH SHELL PANEL WITH VISCOELASTIC CORE
Rukiye ÇOLAK ŞAŞMAZER Mihriban KORUKLUOĞLU	Bursa Uludağ University	PROPERTIES OF DIFFERENT TYPE VEGAN CHEESE RECIPES

SESSION-4, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 20^{00}:22^{00}	MODERATOR- Assistant Prof. Dr. Ebru Tolay
Authors	**Affiliation**	**Topic title**
Zeynep Eda BÜRGE	Maltepe University	ANALYSIS OF MINIMALIZM THROUGH CHOCOLATE PACKAGES IN GRAPHIC DESIGN
Rümeysa CEYHUN Mustafa Yeşilyurt	Yildiz Technical University	İLKOKUL ÖĞRENCİLERİNİN YABANCI DİL DERSİNE OLAN İLGİLERİNE YABANCI DİL ÖĞRETMENİNİN İLETİŞİM BECERİSİNİN ETKİLERİ
Mert ÇALOĞLU Özlem MENTEŞ YALÇIN	Ondokuz Mayıs Üniversitesi	DÜZENLİ SPOR YAPAN KİŞİLERİN YENİ TİP KORONAVİRÜS (COVİD-19) PANDEMİSİ SÜRECİNDE GENEL İYİ OLUŞ DÜZEYLERİNİN İNCELENMESİ
Assistant Prof. Dr. Ebru Tolay	Dokuz Eylul University	EFFECTIVE LEADER COMPETENCIES FROM THE PERSPECTIVE OF GENERATION Y:A QUALITATIVE RESEARCH
Volkan DURAN	Iğdır University	COMPARISON OF EDUCATION SYSTEM IN MEIJI AREA IN JAPAN EMPIRE WITH TANZIMAT REFORM ERA IN OTTOMON EMPIRE
Serdar Kasap Furkan Demirci Sezer Yörük	Bilecik Şeyh Edebali University	ARCHITECTURAL EXAMINATION OF THE CITY OF TOKAT
Doç. Dr. Çağrı GÜMÜŞ Öğr. Gör. Elmas ALVER, Furkan LİMON	Karatay Üniversitesi Polis Akademisi	BİPOLAR BOZUKLUK İLE MÜCADELEDE TOPLUMSAL FARKINDALIK BİLİNCİNİN OLUŞTURULMASI ÜZERİNE HAZIRLANMIŞ ÖRNEK SOSYAL AFİŞ TASARIMLARI
Prof. Rayihe Amenzade		DOMED STRUCTURES IN THE ARCHITECTURE OF MEDIEVAL AZERBAIJAN
Sözer AKYILDIRIM	Iğdır Üniversitesi	İŞGAL ALTINDAKİ PAYİTAHT İSTANBULDA, BOĞAZLIYAN KAYMAKAMI KEMAL BEYİN YARGILANMASI VE ŞEHİT EDİLMESİ ÜZERİNE BİR ÇALIŞMA
Yunus SAHIN Zekiye ALTAN Mehmet SAHIN Emel SAHIN	University of Gaziantep	MEG3B, ALTERNATIVELY SPLICED ISOFORM OF LNCRNA MEG3 INHIBITS CELL PROLIFERATION AND MIGRATION OF ANDROGEN-INDEPENDENT PROSTATE CANCER CELLS

SESSION-4, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 20^{00}:22^{00}	MODERATOR- Dr. Murat Alp
Authors	**Affiliation**	**Topic title**
Elif Yıldırım Ayaz	University of Sağlık Bilimleri	DIABETES UNAWARENESS IN PATIENTS HOSPITALIZED IN THE INTERNAL MEDICINE CLINIC
Asst. Prof.Dr.Eren OGUT Dr.Didem Donmez AYDIN	Bahçeşehir University Trakya University	OPPENHEIMER'S OSSICLE WITH CLINICAL SIGNIFICANCE AND A REVİEW OF THE LITERATURE
Henry Akpojubaro Efegbere Stella Rotifa Kate Ebruke Efegbere	College of Medical Sciences, Edo University	EXPERIMENTAL ECONOMICS MODEL FROM AFRICA: SUSTAINING THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS BEYOND THE COVID-19 PANDEMIC THROUGH THE MULTIDIMENSIONAL SERVICEABILITY, UTILIZABILITY AND PROFITABILITY OF THE INTERNATIONAL CENTRE OF INTER-PROFESSIONAL TEAM BUILDING
Farhana Tabassum Nazia Akram Muhammad Moazzam	The University of Lahore	ONLINE LEARNING SYSTEM IN HIGHER EDUCATION INSTITUTIONS IN PAKISTAN: INVESTIGATING PROBLEMS FACED BY STUDENTS DURING COVID-19 PANDEMIC
Murat Alp	American University	PULLBACKS OF CROSSED MODULES AND CAT 1 - GROUPOIDS
Gözde YÜCEL-TENEKECİ Osman KUTSAL	Ankara University	CONCOMITANT LYMPHOMA AND TUBERCULOSIS IN A PARROT
Bakhtawar Shafique Hafiz Rehan Nadeem Shafeeqa Irfan Muhammad Modassar Ali Nawaz Ranjha Samina Kousar	University of Sargodha	PSYCHOLOGICAL IMPACTS OF COVID-19 PANDEMIC ON HUMANS AND REMEDIES TO COPE WITH STRESS
Dr. Hüseyin DİKME Binnur TURAN	İstanbul Gelişim Üniversitesi Kocaeli Sağlık Hizmetleri MYO	ÖRGÜT KÜLTÜRÜ, LİDERLİK ve PERFORMANS
Manish Kumar Thimmaraju	Institute of Pharmaceutical Sciences	PERCUTANEOUS ABSORPTION STUDY OF ACECLOFENAC USING FRANZ DIFFUSION CELL
Mehmet KEPENEK Ege Anıl DİLER Fulya ULCAY SABAN	Ege University	EFFECTS OF VARIABLE LOAD AND ROTATIONAL SPEED ON THE WEAR BEHAVIOR OF POM PLASTIC HELICAL GEAR

SESSION-5, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 22^{00}:24^{00}	MODERATOR - Prof. R. K. Gupta
Authors	**Affiliation**	**Topic title**
Unaib Afzal Rana Ambreen Memon	University of Sindh	FACTORS LEADING CUSTOMER SATISFACTION IN DIGITAL AGE: A CONCEPTUAL APPROACH
Jobin Sebastian Dr. P. Sakthivel	Annamalai University	CYBER TERRORISM: A POTENTIAL THREAT TO GLOBAL SECURITY
Uzairu Muhammad GWADABE Nalini ARUMUGAM	Universiti Sultan Zainal Abidin, Terengganu, Malaysia	DEVELOPMENT AND EXPLORATION OF MEASUREMENT ITEMS FOR INNOVATIVENESS FOR SMALL FARMERS' ADOPTION OF NEW TECHNOLOGY
Barun Kumar Jha Prof. R. K. Gupta	University of Delhi	ANNOUNCEMENT EFFECT OF CANARA BANK AND SYNDICATE BANK MERGER ON STOCK RETURNS IN INDIA
Jyoti Rastogi P. Bubber R.K. Singh	Gandhi National Open University	IN VITRO MORPHOGENETIC RESPONSES IN LEAF DISC EXPLANTS OF SUGARCANE (SACCHARUM OFFICINARUM L.) COS 96268
Farzad Hossain Md. Ashrafuzzaman Miah	Islamic University of Technology	COMPUTATIONAL INVESTIGATION OF WAVY CARBON NANOTUBE REINFORCED POLYMER COMPOSITES
Noreen Sajjad Ayesha Sultan Ayesha Sadiqa	University of Lahore, Lahore, Pakistan	COMPARISON OF CATALYTIC EFFICIENCY OF GOLD AND PALLADIUM BIMETALLIC CATALYSTS BY USING AUTOCLAVE &GLASS REACTORS

SESSION-5, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

18.08.2020	Tokyo Time 22^{00}:24^{00}	MODERATOR - Dr. Gulshan MAHARRAMOVA
Authors	**Affiliation**	**Topic title**
Associate Professor Gulchohra Aliyeva	Azerbaijan State Marine Academy	MODEL TRANSFORMATIONS WITH A QUANTITY COMPONENT IN UNRELATED LANGUAGES AS FRAGMENTS OF THE LINGUISTIC WORLD VIEW
Dr. Gulshan MAHARRAMOVA	Azerbaijan University	THE WAYS OF DEVELOPING STUDENTS' SPEECH
Dr. Aygun MAHARRAMOVA	Baku State University	ACTUALIZATION OF PHRASEOLOGICAL UNITS IN POETIC LANGUAGE
Dr. Namig Mammadov	Azerbaijan National Academy of Sciences	THE ROLE OF WELFARE PARTY IN THE POLITICAL HISTORY OF TURKEY
Gulanbar Abbasova	Baku State University	THE INTERPRETATION OF LINGUISTIC PARALLELISM IN THE LITERARY TEXTS OF AZERBAIJAN AND ENGLISH
Günəş Cəbrayılova	Azərbaycan Dövlət Mədəniyyət və İncəsənət Universiteti	MƏDƏNİ KODLAR MƏDƏNİYYƏT DAŞIYICISI KİMİ
Sevinc Rəsulova	Azərbaycan Dövlət Pedaqoji Universiteti	DÜNYA KLASSİKLƏRİNİN YARADICILIĞININ AZƏRBAYCAN MAARİFÇI-REALİST UŞAQ ƏDƏBİYYATININ İNKİŞAFINA TƏSİRİ
Assist. Prof. Dr. Hasan BARDAKÇİ Mehmet Ragıp GÖRGÜN	Harran University	FUTURE SCENARIOS TO COME FROM GLOBALIZATION TO FREE TRADE
Dr. Froilan D. Mobo	Philippine Merchant Marine Academy	CLOUD SECURITY CHALLENGES AMIDST THE IMPLEMENTATION OF LEARNING MANAGEMENT SYSTEM IN THE NEW NORMAL
Assist. Prof. Dr. Nihat KÜÇÜK	Harran University	A REGIONAL MODEL FOR DEVELOPMENT OF INNOVATIVE ENTREPRENEURSHIP CULTURE: TECHNOLOGY-BASED BUSINESS DEVELOPMENT CENTER

SESSION-5, HALL-3

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 20^{00}:22^{00}	MODERATOR - Dr. Sanghamitra Adhya
Authors	**Affiliation**	**Topic title**
Vanshika Malik Nikita Oberoi	University of Delhi	CYBER CRIME AND CYBER ATTACKS IN THE AGE OF COVID-19
Shafeeqa Irfan Muhammad Awais Khan Hafiz Rehan Nadeem Muhammad Modassar Ali Nawaz Ranjha Bakhtawar Shafique Ushna Khalid Syeda Mahvish ZAHRA	Institute of Food Science and Nutrition, University	NANOZYMES: NEW FACETS IN FOOD SCIENCE AND TECHNOLOGY
Krishnan Parthipan	Dept of Chemistry SIVET College	MOLECULAR STRUCTURAL ELUCIDATION AND LOCATION OF MN(II) ION IN DIAQUAZINC(DIAQUABISMALONATO)ZINCATE BY SPECTROSCOPIC STUDIES
B. Janani	Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology	TIME DEPENDENT PROBABILITIES OF RANDOM VACATION MODEL
Dr. Sanghamitra Adhya	Kalyani Mahavidyalaya	USING WEB-BASED TECHNOLOGY IN GEOGRAPHY EDUCATION
Dr. Kahkashan Khan	Malaviya University	A STUDY ON CURRENT SCENARIO AND FUTURE PROSPECTS OF COVID-19 PANDEMIC ON INDIA
Simi Joseph	Mahatma Gandhi University	A POST-STRUCTURAL SWAY OF ROB B.J WALKER IN INTERNATIONAL RELATION
Dr. Arda Selin TUNÇ	Ankara University	TYPES OF TUMORS IN DOMESTIC ANIMALS
Aqsa Fahim Taji Farheen Kz	National Alliance for Safe Food	THE BRIGHT SIDE OF COVID-19, BLESSED US

SESSION-1, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 14^{00}:16^{00}	MODERATOR - Dr. Anju Lis Kurian
Authors	**Affiliation**	**Topic title**
Jayashankar.J	Kollam District, Kerala State, India	IMPACT OF COVID-19 PANDEMIC ON INDIAN AND CHINESE ECONOMY: A COMPARATIVE STUDY
Shrawani Shagun	Mody University of Science and Technology Rajasthan,India	LOCATING EHRLICH'S CONCEPT OF LAW IN INDIAN LEGAL JURISPRUDENCE & ROLE OF JUDICIARY
Mr. Niteesh Kumar Upadhyay **Ms. Swati Kaushal**	Galgotias University	ROLE OF ARTIFICIAL INTELLIGENCE IN MITIGATING COVID-19- A WAY AHEAD
Mohammed Muqtadir **Bhumika Sharma**	Mechanical Man Engineering Services Private Limited, Pasonda, Ghaziabad	WORLD OF WORK POST COVID-19: WITH SPECIAL REFERENCE TO EMERGING RIGHTS AT WORK
Shahi Shaika	Amity University	RELATIONSHIP BETWEEN LANGUAGE AND CULTURE: AN ETHNOSEMANTIC STUDY OF KASHMIRI LANGUAGE
Rico Paulo G. Tolentino **Ma. Leonora Sta. Ana** **Khristian S. Liwanag**	Polytechnic University of the Philippines	ADAPTATION OF PHILIPPINE EDUCATION TO OPEN EDUCATIONAL RESOURCES
Dr. Anju Lis Kurian **Dr. C. Vinodan**	Gandhi University	ENVIRONMENTAL CONSERVATION AND LIVELIHOOD ISSUES IN INDIA
Sonal Nain	University School of Humanities and Social Sciences	THE CONFINEMENT SPECTRUM : A COMPARATIVE STUDY OF FEMINIST AND PRISON LITERATURE
David Daneesh Massey **Mahima Habil Massey**	St. John's College	ENVIRONMENTAL CONSCIOUSNESS AND RESPONSES OF COLLEGE STUDENTS TOWARDS THEIR URBAN DWELLING

SESSION-1, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 14^{00}:16^{00}	MODERATOR - Uzma Ayaz
Authors	**Affiliation**	**Topic title**
Sapna Arpit Sand	Manav Rachna University	SYNTHESIS OF BIODEGRADABLE HYDROGELS PIAC BY INVERSE SUSPENSION POLYMERIZATION
Pradeep K Varshney Ruchika Batra Ritika	Manav Rachna University	RECOVERY OF LITHIUM FROM WASTE LITHIUM-ION BATTERIES (LIBS) TO PROTECT THE ENVIRONMENT: A REVIEW
Md. Ashrafuzzaman Miah Farzad Hossain	Islamic University	ANALYSIS OF THIN FILM LIQUID BOILING AT VARIOUS WETTING CONDITIONS ON NANOSTRUCTURED SURFACE
Ankit Gupta Mahendra Kumar	University of Lucknow	EFFECT OF ANNEALING TEMPERATURE ON MICROSTRUCTURE AND SURFACE MORPHOLOGY (AFM) OF ZNO THIN FILMS WITH MG DOPANT
Sachin Kaothekar	Mahakal Institute of Technology	LONGITUDINAL THERMAL INSTABILITY OF TWO-COMPONENT RADIATIVE PLASMA WITH EFFECT OF NEUTRAL COLLISIONS HALL CURRENT AND ELECTRON INERTIA IN HYDROGEN GAS (HI) REGION
Paromita Mondal	CoochBehar Panchanan Barma University	AN ASSESSMENT OF THE ROLE OF GOVERNANCE IN THE EDUCATION OF ADOLESCENT GIRLS IN MATHABHANGA MUNICIPALITY, WEST BENGAL
Uzma Ayaz	The University of Poonch Rawalakot	GENETIC VARIABILITY, ASSOCIATION AND DIVERSITY STUDY AMONG THE SUNFLOWER GENOTYPES AT SEEDLING STAGE BASED ON DIFFERENT MORPHO-PHYSIOLOGICAL PARAMETERS UNDER POLYETHYLENE GLYCOL INDUCED STRESS
Rajeshkumar Selvaraj, Mageshwaran Subramani, Manoharan Ramamoorthy	Vellore Institute of Technology, Vellore, India.	FREE AND FORCED VIBRATION ANALYSIS OF LAMINATED COMPOSITE HYBRID-MR ELASTOMER SANDWICH BEAM USING HIGH-ORDER THEORY

SESSION-2, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 16^{00}:18^{00}	**MODERATOR-** Dr. Rama Gandotra
Authors	**Affiliation**	**Topic title**
Niteesh Kumar Upadhyay MahakRathee	Galgotias University	IMPACT OF ARTIFICIAL INTELLIGENCE ON INTELLECTUAL PROPERTY RIGHTS
Amit Joshi Preeti Bhaskar	ICFAI University	REMOTE TEACHING AMIDST COVID19 IN INDIA: APPROACH, CHALLENGES'LEARNING
Munazza Jabeen Saba Kausar Farhana Naz	International Islamic University, Islamabad	HOW TO IMPROVE THE EFFECTIVENESS OF MONETARY POLICY IN PAKISTAN
Saish S. Nayak Dalal	College of Education, Ponda	A CASE STUDY ON INDIGENOUS EDUCATION FOR INTERDEPENDENCE AND ECONOMIC SUSTENANCE OF A VILLAGE IN GOA
Ariel S. Barrias	Philippine Science High School-Cordillera	OVERSEAS FILIPINO WORKERS AND ECONOMIC GROWTH, EMPLOYMENT AND HOUSEHOLD ECONOMIC WELFARE, 1989-2018
Imtiyaz Ahmad Shah Imtiyaz-ul-Haq	University of Kashmir	HEALTH EXPENDITURE AND ECONOMIC GROWTH AMONG CENTRAL ASIAN COUNTRIES: A PANEL DATA APPROACH
MUHAMMAD SULEMAN NASIR Muhammad Umar Shamas Nasir	Gomal University	HISTORY OF CORONAVIRUS AND ITS IMPACT ON THE WORLD'S ECONOMY
DR. ALPER RAİF İPEK	Başkent University	USING OF ADDITIVE (DIGITAL) COLOR SYSTEM INSTEAD OF SUBTRACTIVE (ANALOGUE) COLOR SYSTEM IN AN ONLINE WORLD
Ferhat Cagri ARAS Associate Prof. Dr. Aparna Srivastava	Noida International University	FREE AND FORCED VIBRATION ANALYSIS OF LAMINATED COMPOSITE HYBRID-MR ELASTOMER SANDWICH BEAM USING HIGH-ORDER THEORY
Assoc. Prof. Dr. Malahat Abdullayeva	Azerbaijan State Pedagogical University	USE OF NEW EDUCATION TECHNOLOGIES IN HIGHER EDUCATION: UNIVERSITY WITHOUT WALL
Dr. Rama Gandotra	**Pt. M.L.S.D. College for Women**	SOCIAL WELLNESS FOR RESILIENCE IN POST PANDEMIC ERA – CHALLENGES AND SOLUTIONS

SESSION-2, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 16^{00}:18^{00}	MODERATOR- Dr. Purnima
Authors	**Affiliation**	**Topic title**
Shruthi A , Manuel Rodrigues , Satyendra R V , Latha K P , Vagdevi	Alva's Institute of Engineering and Technology	SYNTHESIS, IN VITRO ANTIMICROBIAL AND MOLECULAR DOCKING STUDIES OF NOVEL 5-CHLORO-2-HYDRAZINYL-1, 3-BENZOXAZOLE DERIVATIVES
Varsha Unni P K Vigneshwar K	Bharath Institutes of Higher Education and Research	ELECTRIC VEHICLE MODELING AND SIMULATION
Amrit Kumar Mishra, R.K.Shukla	University of Lucknow	A DETAILED DEGRADATION STUDY OF THE HETEROJUNCTION OF PEROVSKITE/SPIROMEOTAD IN THE SOLAR CELL
Rajesh Kumar Singh Amit Rajan Ruchita Tripathi Monika Singh Vinamra Sharma Anil Kumar Singh	Banaras Hindu University	A PHYTOSTEROL OF SEMECARRPUS ANACARDIUM LINN. LEAF EXHIBITS ANTITUMOR ACTIVITY AND ENHANCES SURVIVAL OF TUMOR BEARING MICE
Dr. Purnima Dr. Shivender Rahul	Amity University Noida, Uttar Pradesh India	TECHNOLOGY AND NEW DIMENSIONS FOR STUDENTS OF LANGUAGE AND LITERATURE
Rakhi Singh Rajesh Kumar Singh	Hindu University, Varanasi-221005 India	NIPAH VIRUS: A SCIENTOMETRIC STUDY
Deepak Kaushik	Galgotias University	REFLECTION ON THE ROLE OF AI IN TRACKING AND FORECASTING POTENTIAL OUTBREAKS: COVID-19 AND AN EARLY GLOBAL WARNING SYSTEM
JAYASHREE.P R. THIRUCHELVI	Vels Institute of Science	ANTIMICROBIAL, ANTIOXIDANT, AND ANTICANCER ACTIVITIES OF BIOSYNTHESIZED SILVER NANOPARTICLES USING MARINE RED SEAWEED GELIDIELLA ACEROSA
Dr. Vikas Prajapati Dr. Akansha Prajapati	University of Baroda	CAN ORTHOSIS AND CORRECTIVE EXERCISES CORRECT FLAT FOOT?

SESSION-3, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 18^{00}:20^{00}	MODERATOR - Dr. Meenakshi Bansal
Authors	**Affiliation**	**Topic title**
Milonjyoti Borgohain	Cotton University, Assam, India	AN ANTHROPOLOGICAL STUDY ON TRADITIONAL FOOD CULTURE AMONG THE MISINGS OF ASSAM, NORTH-EAST INDIA
Umang Pandya Lokesh Bharti S.N.A. Jaaffrey	Shankersinh Vaghela Bapu Institute of Science	AZIMUTHAL MAGNETIC FIELD AND LEAKAGE OF FIELD FREE MATTER FROM DIFFERENT OPTICAL DEPTHS OF UDS
Rishikesh Sisodia	Galgotias University	EXPLORING THE ROLE OF SOCIAL MEDIA FOR SMALL MEDIUM ENTERPRISES AS A COMMUNICATION TOOL
Husni Rahman Yoga Nadya Aulia Malau	State Islamic University of North Sumatra	3D ANIMATION ONLINE LEARNING CLASS: IMPROVING FOREIGN LANGUAGE ABILITY THROUGH PLOTAGON 3-DIMENSIONAL BASED ANIMATION TO SUPPORT SFH (STUDY FROM HOME) INDONESIA GOVERNMENT'S PROGRAM DURING THE COVID-19 PANDEMIC THROUGH ONLINE LEARNING CLASS IN LTECH (LANGUAGE AND TECHNOLOGY)
Assistant Professor Sanjayan T.S	Goa University	ENGAGING MIGRANTS AND REFUGEES: PEDOCOMPUNITY APPROACH IN PEDAGOGY
Vidya Padmakumar Shine P J	Mangalore University	DISTRIBUTION AND DIVERSITY OF MANGROVE SPECIES ALONG THE COASTLINE OF MAHE TOWN, TERRITORY OF PONDICHERRY, INDIA.
Dr. Meenakshi Bansal	J.V.M.G.R.R. College	RESEARCH IN THE TIME OF COVID-19:AN INDIAN TEACHER'S PERSPECTIVE
Dr. Navdeep Kumar	Lyallpur Khalsa College	FOOD SECURITY FOR INCLUSIVE GROWTH IN SOUTH ASIA
Prof. Surekha Rana Ms Priyanka Bhaskar	Kanya Gurukul Dehradun	A STUDY TO INVESTIGATE ON E-GOVERNMENT INITIATIVES IN UTTARAKHAND
Ms. Rupa Pradhan Ms. Jayati Kharga	Indian Institute Of Legal Studies	CYBER ESPIONAGE: USE AND MISUSE OF TECHNOLOGY AS AN EMERGING CHALLENGE TO THE INTERNATIONAL COMMUNITY

SESSION-3, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 18^{00}:20^{00}	MODERATOR- Assoc. Prof. Dr. Shalini Jaiswal
Authors	**Affiliation**	**Topic title**
Waheed A. Adeosun, Prof. Abdullah M. Asiri Prof. Hadi M. Marwani Prof. Mohammed M. Rahman	King Abdulaziz University	NON-ENZYMATIC ELECTROCATALYTIC DETECTION OF URIC ACID USING POLYDOPAMINE/POLYPYRROLE COPOLYMERIC FILM
Assoc. Prof. Dr. Shalini Jaiswal	AMITY University	SOLVENT-FREE SYNTHESIS AND ANTIMICROBIAL ACTIVITY OF NOVAL ISOXAZOLE DERIVATIVES
WAQAS AHMAD Prof. Dr .Hakoomat Ali Dr.Shabir Hussain	Bahauddin Zakariya University	BIOFORTIFICATION OF IRON AND ZINC IN CHICKPEA CULTIVARS (CICER ARIETINUM L.) UNDER ARID AND SEMI ARID CLIMATIC CONDITIONS OF PAKISTAN
Ruchita Tripathi, Rajesh Kumar Singh Anil Kumar Singh	Banaras Hindu University	STANDARDIZATION OF POTENT AYURVEDIC DRUG "PANCHAVALKALA" (A POLYHERBAL AYURVEDIC FORMULATION) USED IN DIABETES MANAGEMENT AMONG NORTH INDIAN POPULATION
Bijoy Das	Jadavpur University	PYROLYSIS MODELING OF WASTE-DERIVED FUEL THROUGH COMBINED THERMODYNAMIC AND KINETIC SIMULATIONS
Dr. Abhilasha Sisodia	Galgotias University	ARTIFICIAL INTELLIGENCE AND DRONE TECHNOLOGY AS A PROTAGONIST FOR FOREST AND WILDLIFE CONSERVATION
Dr. Siddhant	Durgesh Nandini Degree College	A NEW FILTER FOR SAFE VIEW OF SOLAR ECLIPSE
Salim Khan Anisa B Khan	Pondicherry University	ENVIRONMENTAL MITIGATION POST COVID-19: AN RSGIS BASED ASSESSMENT
Dr Ritu Talwar Dr Priyanka Agarwal	NDIM , New Delhi ,INDIA	A SYSTEMATIC REVIEW OF BLOCKCHAIN

SESSION-4, HALL-1

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 20^{00}:22^{00}	MODERATOR- Dr. Sreetanuka Nath
Authors	**Affiliation**	**Topic title**
Kanokwan Somwong **Hataichanok Pandith**	Chiang Mai University, Thailand	ANTI-INFLAMMATORY ACTIVITY OF INDIAN ELM (HOLOPTELEA INTEGRIFOLIA (ROXB.) PLANCH) EXTRACTS
Manuel Rodrigues **Basavaraju Bennehalli** **Vagdevi H M** **Sharath B S**	Alva's Institute of Engineering and Technology	SYNTHESIS, ANTIMICROBIAL EVALUATION AND DOCKING STUDIES OF NEWLY SYNTHESIZED BENZOXAZOLE DERIVATIVES
S.Santhosh Kumar **Jayaram Dasari** **G.Godwin**	University in Tanzania, Dar es salaam	**DESIGN AND ANALYSIS OF ROCKET NOZZLE TO INCREASE THE THRUST AND MASS FLOW RATE**
Areerat Chuasakhonwilai **Hataichanok Pandith**	Chiang Mai University	**HPLC QUATITATIVE ANALYSIS OF SCUTELLAREIN TETRAMETHYL ETHER: THE BIOACTIVE COMPONENT OF CHROMOLAENA ODORATA AND PRAXELIS CLEMATIDEA**
Bijoy Das	Jadavpur University, Salt Lake	**GASIFICATION CHARACTERISTIC OF WASTE TYRES WITH AIR IN AN ATMOSPHERIC BUBBLING FLUIDIZED BED**
Roshani Gupta	Cluster University of Jammu	FGMOS: A TECHNIQUE FOR IMPLEMENTATION OF DIGITAL INTEGRATED CIRCUITS
Dr. Sreetanuka Nath	Government Training College	LEVELS OF BRAIN HEMISPHERIC DOMINANCE BASED ON GENDER, SOCIO-ECONOMIC STATUS AND ACADEMIC ACHIEVEMENTS: AN ASSOCIATIVE STUDY
Dr.R.Sivarethinamohan **Samreen Ayesha** **Biju Toms** **Dr Kavitha D** **Dr Priya. J**	Department of Professional Studies, CHRIST	ENVISIONING THE ROLE OF FAMILY SOCIAL CAPITAL (FSC)FOR EDUCATIONAL SUCCESS AND MENTAL WELL-BEING OF ASIAN CHILDREN IN HIGHER EDUCATION DURING THE TIMES OF COVID-19 PANDEMIC: AN OVERVIEW
Hasan Kaplan **Kenan Sevinç** **Nihâl İşbilen**	İbn Haldun University Çanakkale Onsekiz Mart University, Marmara University,	A Field Study on the Making Sense of Natural Disasters and Coping: With a Reference to Covid-19 in Turkey
Sandeep Kumar **Naveen Gupta**	Lovely Professional University	EFFECT OF TWO CROSS FOCUSED COSH-GAUSSİAN LASER BEAMS ON THZ GENERATİON İN RİPPLED PLASMA

SESSION-4, HALL-2

Meeting ID: 729 064 4418
Passcode: 252525

19.08.2020	Tokyo Time 20^{00}:22^{00}	MODERATOR- Dr. Subhoda Banerjee
Authors	**Affiliation**	**Topic title**
Vijendra Kumar Abhishek Barnwal R. K. Shukla Jyoti Shakya	University of Lucknow	ROLE OF FILLER-POLYMER INTERFACE ON THE THERMAL CONDUCTIVITY IN POLYMER COMPOSITES
Nazma Akter	University of Dhaka	AN ANALYTICAL STUDY OVER BANGLADESHI LEARNERS' ATTITUDE TOWARD KOREAN LANGUAGE AS K-FAN IN 2020
Bimani Randeniya Janaka Wijesinghe Vidarshani Ellepola Thisun Ranpatabendi	Uva Wellassa University	ATTEMPT TO PRODUCE A PLANT BASED BURGER PATTY SENSATIONALLY SIMILAR TO MEAT
Palaniappan Selvakumar Pudupadi Sundararajan Muthusamy Sarojadevi	Anna University	EFFECT OF MOLECULAR WEIGHT ON THERMAL BEHAVIOR AND PROCESSABILITY OF OLIGOMERIC PHTHALONITRILE RESINS
Shalmoli Dutta	International Institute for Population Sciences	ANALYSIS OF NUTRITIONAL STATUS AMONG SCHEDULED TRIBE MEN AND WOMEN IN INDIA
Aritra Sen	International Institute for Population Sciences, Mumbai	AN ANALYSIS OF TIME-SERIES MODELS FOR AGE-SPECIFIC MORTALITY RATES IN INDIA
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CONTENT

IMAGE PROCESSING USING MULTISCALE TRANSFORM: A REVIEW

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Abstract

This paper review about the recently published papers that deals with the application of wavelet transformation in image processing including image denoising, image compression and bring up the light on the theory of shearlet transformation that can upgrade the future of wavelet transformation.

Keyword: wavelet transformation, image denoising, image compression, shearlet transformation.

Introduction

In history, wavelet was firstly discovered by Grossman and Morlet [18], they Shower light on the word from French language "ondelette"(small wave). The progress of wavelet can be attached with many thoughts beginning with the Haar's work in 19th century [19]. In 1981 [18], Geophysicist Jean Morlet bring the light on the concept of wavelet. Wavelet is suitable for stationary signals that can instantaneously vary with time. It brings out researchers of different field from mathematicians, quantum physics, electrical engineers and many more together to explore and bring out some extra ordinary work together. Main applications of wavelets are image processing, signal processing, geophysics application theory, Finger print verification, face recognition, automobile detection, [12-18].

Wavelet transformation was introduced because of the limitation of Fourier analysis which is ideal in case of studying the stationary data and give us knowledge of what frequency are present in your signal and detail or information of Fourier analysis is invisible or lost and Short time Fourier analysis comes out to be very sensitive towards the high or low change in the signal whereas wavelet was introduced by considering non stationary data in mind and give us detail about the frequency present on the signal and where wavelet transformation is localised but sine and cosine function of Fourier transformation are not and they have single set of basic function but wavelet transformation has infinite set of basic function.

In the recent time application of wavelet has taken a vast height in image denoising, image compression, image enhancement and wavelet is used by FBI to encode its database of many finger prints. In medical Field wavelet is used to detect the abnormalities of scans of various parts of the living creatures. DNA analysis, Protein analysis, and computer graphics.

Now a day's wavelet transformation plays an important role in image processing and much more suitable when compared to Fourier transformation. Wavelet succeeded in much application such as image denoising, image compression, super-resolution, image enhancement. In the 21st century where image is considered one of the methods for communication and attracts people and wavelets provides various applications to it.

Wavelets

The notion of wavelets came into being because the Fourier analysis which depends on oscillating building blocks is poorly suited to signals that change suddenly. A wavelet [19] is crudely a function which together dilates and translates determine all functions of our need.

A function $\psi \in L^2(\mathbb{R})$ is called an orthonormal wavelet if the system $\{\psi_{j,k}\}$ forms an orthonormal basis for $L^2(\mathbb{R})$ where $\psi_{\mathrm{j,k}} = 2^{\frac{\mathrm{j}}{2}}\left(2^{\mathrm{j}}\mathrm{x} - \mathrm{k}\right)$ where $\mathrm{j}, \mathrm{k} \in \mathbb{Z}$

Types of wavelets

Haar wavelet was first discovered by Alfred Haar [19] in the 19th century, included a square shape of functions which joint and form wavelet. It has a low computing requirement which allow us to take a

step forward in image processing but it has limited application as it is not continuous, In 1988, Daubechies [8] work immediately stimulated a rapid development in the theory and applications of wavelet analysis. DbN can be considered to be the good example discrete wavelet transformation). It is the family of orthonormal wavelets. Each DbN is associated with a scaling function which is capable to generate orthonormal MRA It was found that some of the DbN (N = 1 to 10) not necessarily symmetric. Db1 is same as the Haar wavelet and have a supportive length 2N-1, Meyer Wavelet [27] was introduced by Yves Meyer in 19th century [27]. It can be applied in many cases such as adaptive filters, fractal random fields and many more, it is continuous and orthogonal, Morlet Wavelet When complex exponential is multiplied which the Gaussian window is lead to the formation of Morlet wavelet. it has many applications and used in the analysis of abnormal heartbeat behaviour in the electrocardiogram (ECG).

Wavelet Transformation

The wavelet transform was first introduced in the context of a mathematical transform by Grossman and Morlet in 1984 [1]. It is a tool which allows us to cut the data, function or operator into different frequency which allow us to study each component with a resolution that can match to the scale.

Continuous Wavelet transformation: The continuous wavelet transformation (CWT) of a function $f(x) \in L^2(\mathbb{R})$ with respect to $\psi \in L^2(\mathbb{R})$ is given by

$$CWT(f)(a,b) = |a|^{\frac{j}{2}} \int_{-\infty}^{\infty} f(x)\psi\left(a^j(x-b)\right)dx. \qquad (1)$$

Continuous wavelet transformation is very effective in determining the damping ratio of oscillating signals. CWT provides more detail information of time-scale representation as compared to Short Time Fourier transformation which is capable to prove us the time-frequency information. CWT is used in decomposing the signal into high and low frequency components. They consist of real valued and complex valued wavelet.

Discrete Wavelet Transformation: The discrete wavelet transformation (DWT) of a given function $f(x) \in L^2(\mathbb{R})$ with respect to $\psi \in L^2(\mathbb{R})$ is given by

$$DWT(f)(a,b) = |a|^{\frac{j}{2}} \int_{-\infty}^{\infty} f(x)\psi\left(a_0^j x - kb_0\right)dx \qquad (2)$$

where $a_0 \neq 0\ and\ j,k \in \mathbb{Z}$. DWT transforms the discrete time signal to a discrete wavelet representation it is very beneficial in removing noises from image and it can also be termed as image processing. DWT is capable in various application fields such as from signal analysis to signal compression. Main application is to remove noise from an all kind of signals, images can be stated as image denoising. DWT decomposes the signal into 'approximation' and 'detail' coefficients at each level.

Multiresolution Analysis: It was 1989[25-26], Stephane G. Mallat discovered the underlying concept for obtaining orthonormal wavelets now popularly known as the Multiresolution analysis (MRA). The main purpose of the analysis is to obtain various approximations of a function at different resolution. It also provides the fast implementation of wavelet decomposition and reconstruction that makes wavelet to be a practical tool for image processing and have a bright future in medical images.
Let $\{V_j; j \in \mathbb{Z}\}$ be the closed subspace of the subspace $L^2(\mathbb{R})$ combine with φ is known as MRA if it satisfies the following properties

- (Increasing) $V_j \subset V_{j+1}$
- (separation) $\cap_j V_j = \{0\}\ for\ all\ j \in \mathbb{Z}$
- (density) $\cup_j V_j = L^2(\mathbb{R})\ for\ all\ j \in \mathbb{Z}$
- (scaling) $f(2t) \in V_{j+1}$ iff $f(t) \in V_j\ for\ all\ j \in \mathbb{Z}$
- (orthonormal basis) There exist a function $\varphi \in V_0$ such that $\{\varphi(t-n); n \in \mathbb{Z}\}$ forms an orthonormal basis for V_0

2-Dimension Wavelet Transformations: An image can be considered to be the best example for 2 dimensions and with the help of wavelet transformation applying to the image and it leads to the formation of various applications such as image denoising, image enhancement, super-resolution, image compression and many more. Decoded image of wavelet transformation or in simple words, image can be claimed as a 2-dimensional Signal.
Image consists of pixels and we can say that image can be considered as a matrix which contains pixel values with N (number of rows) and M (number of columns) present in it. We can study the image using the H, V, D sub-bands of the image or Horizontal, vertical and diagonal sub-bands of the image. After that image can be treated as in one-dimension and algorithm can be applied to the image [30, 31]. Scaling function can be given as

$$W_\psi(j_0, m, n) = \frac{1}{\sqrt{MN}} \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} f(x)\psi(j_0, m, n) \quad (3)$$

where j_0 is an arbitrary scaling function $W_\psi(j_0, m, n)$coefficient define the approximation at a scale j_0 of $f(x, y)$ can be determined by 2-dimension inverse wavelet transformation. Diagonal, Horizontal, vertical sub bands $(i = H, V, D)$ are represented by

$$W_\psi^i = \frac{1}{\sqrt{MN}} \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} f(x)\psi_{j,m,n}^i(x, y) \quad (4)$$

Application of wavelet in Image processing:

In 1964, Jet Propulsion Laboratory applied used the technique of image processing in improvising in quality of the digital image [2]. In 1970 [21-30], the concept of image processing was applied to medical images devices which generated 2D image and 3D, volume by passing X ray. Moreover, it has much application in various fields such as defence, robot vision and many more.
Applying wavelets in image processing provides various applications such as image denoising [21-30] which means removing noise from a image which may arises due to various reasons such as imperfect instrument, due to natural phenomenon and many more. It is useful in compressing the size of the image without losing the quality [35], enhancing the quality of the image and super-resolution of image enhances. Image processing is considered to be a new application on wavelets transformation which is growing and has a capability to attain great height in the coming future. Detail information that when the image is passed with low pass filters and high pass filters along rows which provide horizontal approximation and horizontal detail which pass through low pass and high pass filters along columns which lead to the formation of approximation, vertical detail, horizontal detail and diagonal detail

Image Denoising:

Figure 1: image denoising

Wavelet transformation is very effective in removing noises from the images. Firstly, images get decomposes into 4 sub-images i.e., approximation, horizontal, vertical and diagonal and the same step is followed further and noise is added to image and denoised with the help of wavelet and inverse wavelet transformation. Denoising of an image is successful or not is measured by different type of parameters such as PSNR, SSIM, MSE, RMSE and many more. We need to follow some step
1. Firstly determine the PSNR value of noised images. 2. After applying wavelet and inverse wavelet transformation and determine the value of respected parameter.

Mallat and Hwang [25-26] introduced the wavelet transformation which is capable to demonstrate application of signal which can change or vary with time. Donoho and stone introduce the world to thresholding by coining hard or soft Thresholding wavelet denoising method [9-12]. Wood and Johnson applied image denoising method to cardiac images to either complex or magnitude domain

and provide us with better signal-to-noise (SNR) ratio. Malfait and Roose [28] denoise image using wavelet transformation; they considered 2 measures named as novel measure and classic measure. Novel measure takes into account the geometrical constraints and classic measure taken into account the smoothness of the image. The smoothness measure and the constraints are combined in a Bayesian probabilistic formulation, implemented as MRF image model. The Manipulation of the wavelet coefficients is consequently based on the obtained probabilities and the result provide us denoised image. , magnitude images used both shrinkage denoising and Nowak's algorithm with both soft and hard Thresholding which brings out the change in SNR with is associated with the kind of threshold and compared the data-adaptive filtering proving us more suitable result as compared to the wavelet shrinkage.

Argenti and Torricelli [3] took kind of wiener filter with shift-invariant, it proves that by the parameter of filter and noise model and it proves that by the parameter of filter and noise model wavelet decomposition can be determined and make it more well detailed. Xie et al [38] provide the new spatially varying threshold, provided method for denoising based on the doubly stochastic process. Wink and Roerdink [37] brings the light on a method that is suitable for low SNRs but cannot be applied on reasonable quality images as they leads to heavy decomposition as it estimated two denoising method that are Gaussian and Wavelet based smoothing. In the result it was found that at low SNR both of the technique comes out with same kind of result but in case of high SNR Wavelet method provides us better result that means Wavelet method is more successful as compared to the other method that is Gaussian method.

Choi and Baranuik [7] took images of complex set have a property that their norms are bounded called Besov norms it took an algorithm forward with the image of wavelet shrinkage in mind that somehow matches with the wavelet shrinkage and prove that it can be used for image denoising and proposed POCS algorithm and shows much more suitable result. Yoon and Vaidyanathan [39] offered the custom Thresholding scheme that can easily outperform the traditional Thresholding technique. Hsung et al. [21] took into consideration the traditional method and provide the improved version of traditional method by using the below steps:

1. Second order orthogonal pre-_filter design method that was taken into consideration and apply on multi wavelets having higher multiplicity to determine the result.
2. Stein's unbiased risk estimator or SURE was used to check the result for each and every resolution point and provide us the result that multivariate shrinkage of higher multiplicity provide much more better result. Sudha et al. [32] proposed a method to denoise a image using denoising technique and Thresholding function (optimize) . Noise image is taken to measure the denoising result and in result the proposed algorithm outperform the result wavelet based technique.

Poorna Chandra [31] took a signal which is contaminated by Gaussian noised and applies wavelet denoising method to the signal to recover the noises and study the noise-free reconstruction property. Vohra and Tayal [35] performed the removal of noise using discrete wavelet transformation. The experiments were conducted to study the suitability of different wavelet and the result shows that coiflet wavelet perform extremely well in image denoising. And in 2010, 2011 many denoising effective image denoising methods based on this model combining different transforms are obtained. Giaourisa and Finch [17] took wavelet transformation and provide a scheme denoising that stop the signal from desorting and the noise components were found to be very small. Veena et al.[24] took one dimensional signal and work on the extension of it to two dimensional image processing. Vyacheslar V. Lyashenko, M Ayas Ahmad, Oleg Kobylin [36] took the method of denoising into a forward direction and introduces it into polymer science and provide the result that wavelet transformation allow us to select the specific area that is to be analysed, discussed the possibility of wavelet analysis as a separate procedure for processing the image of polymer composite analysis as separate procedure for processing the image of polymer composite.

Khairul, Yunus, Umam [33] used Shows the comparative study for image denoising and used discrete Wavelet transformation in order to show which one is more successful and the result comes out that PSNR and MSE value shows the result is extremely promising in favour of quaternion wavelet transformation.. Setu Garg, Ritu Vijay, Shabhana uruj [15]; compared the image denoising technique in medical MR images and apply different kind of filters such as mean, median and adaptive filter as when the result of PSNR and RMSE is compared the result show us that adaptive filter give us more dazzling result as compared to the left 2 filters. Fathimuthu Johorah and Shajun Nisha [22] used

wavelet transformation on MRI Liver Image Using Discrete Wavelet Transformation; image is denoised using mean and median filters. Inverse wavelet transform is applied to the taken image to reconstruct the image. Image qualitative was measured by PSNR, MSE. DB4 provide us the successful result as compared to the other.

Image compression:

Image compression means to reduce the size of an image without having any compromising in the quality of the image which allows us to store more images in limited memory. It is considered to be most important application of image processing using wavelet transformation. Wavelet transformation gives better quality as compared to traditional JPEG algorithm J.C. Feauveau gave their contribute to this field that and considered a satellite image that can be compressed with the help of wavelet with multi-wavelet based wavelet. Khashman and Dimililer [23] introduced optimum compression system by compressing a digital image with help of neutral network and Haar wavelet transformation.

Amir Averbuch, Danny Lazar, and Moshe Israeli [5] proposed an algorithm for image compression combination with wavelet transformation. Firstly black and white image is compressed and the result shows that PSNR value is above 30 and Compression ratio comes out to be 60-65. Further, applied the same method for compressing the images of face and decomposed faces and the result is determined by the PSNR value that comes out to be 30-36 and Compression ratio 38-40. Praveen and Elamaran [13] they attempted to reduce the bits of an image per pixel, Garg and gupta developed function which can compete with DCT which help us to compress the images, took the image and transform the image in eight by eight blocks and inverse transformation is applied to reconstruct the image. Macarena Boix, Begona Canto [5] introduced the new type of Thresholding in wavelet transformation method where they have a certain value of Thresholding and the coefficient whose value are less than the threshold value are removed with the aim to get the successful compression ratio and to retain the energy and applied the method in 20 images. In THR1 comes out that compression ratio is very small and retained energy is 99.9973 and further decrement by 0.04 percent and slight increase in compression ratio was measured. Sonja Grgic, KreSimir KerS, Mislav Grgic [16] in this paper they include some basics of wavelet and compare the types of wavelets in image compression. Proved that discrete wavelet transformation performed better in compression ratio when compared to the JPEG image. Although the compression ratio of image compression of JPEG comes out to be good but there are some blocking artefacts in high compression ratio and it is not present in wavelet based method.

Vikas Pandey [30] apply the mother wavelets and the result is observed with PSNR and CR. Discrete Wavelet transformation was used to decompose a image and by the help of inverse wavelet transformation the image was reconstructed and the PSNR value comes out to be 40 Db after the compression steps followed, then the two images are indistinguishable. Khatun and Chowdhury [6] introduce a new scheme for image compression with discrete wavelet transformation and provide the sufficient high compression ratio without any decrease in the quality of the image.

Mridul Kumar Mathur and Gunjan mathur used wavelet transformation to compress the image and measure the result through parameter PSNR, MSE and CR that proves to be successful. Ravi Prakash Dewangan Singh Studies the behaviour along with different type of images and introduce to the type of function which is appropriate for all type of images and the result is measured by PSNR, MSE, and CR ratio. Mohammad Al-Shereef [29] compressed the image using Daubechies Wavelet transformation and compare with different kind of image and result comes out to be that stamp images shows better CR ratio rather than the other images and the result was compared by PSNR or PSNR value of stamp images is higher than the others.

T.S Hasan [20] introduces to the concept in traditional denoising method and ignoring the less affected element and taken high impact element in consideration and considers DCP method and the result comes out to be satisfactory. R. Vidyapriya and B. Vidya [34] proposed a different method for image compression along with exemplar based inpainting and image is divided into different regions which is textually important and textually not important regions. Wavelet transformation is applied to compress an image at different regions and Compression ratio is calculated separately. Later, inverse wavelet transformation is applied on the compressed image at decoder side to reconstruct the image. Exemplars are used to cut down the blocking consequence and image borderline regions effectively. Result shows us satisfactory result as compared to the original image.

Amjad Ali, Ayaz Ullah, Anwar Hussain, Sulaiman Khan, Shah Nazir[31] Proposed the algorithm which works when image is considered to half of its length and which is termed as detailed level. Haar wavelet transformation, discrete cosine transformation and run length encoding techniques is carried out to compress the image result. For stimulation purpose image is segmented into 8X8 and image is decoded operation is carried out to reconstruct the image and the result was tested by PSNR and CR which provide the satisfactory result in case of Haar wavelet transform which proves that Haar wavelet transformation is more successful in case of this proposed image compression technique as compared to Discrete cosine transformation and run length encoding technique. Ruchi Agarwal, C.S. Salimath and Khursheed Alam [1] took true colour image where image is compressed using discrete wavelet transformation through sub band coding, number of compression carried out from single, double and triple and the method used was Wavelet Difference Reduction (WDR), adaptively Scanned Wavelet Difference Reduction (ASWDR), Set Partioning In Hierarchical Trees (SPIH), Set Partioning In Hierarchical Trees3D (SPIH3D), Spatial - orientation Tree wavelet (STW), Embedded zero tree wavelet (EZW) and CR, BPP, PSNR and MSE value is calculated in each step. In result it was found that the image loses information when compressed second and their time. Now for grey scale image MRI image is compressed triple times using Haar wavelet, Daubechies wavelet, Symlet wavelet, coiflet wavelet, Biorthogonal wavelet and the result comes out to that Haar wavelet, Daubechies type 4 and Biorthogonal wavelets are the best performance when compared with other wavelets.

Shearlet Transformation:

Wavelet was introduced after the limitation of Fourier and Short time Fourier analysis and performs very well and proved to be very beneficial but even moon is not all white that means wavelet too have a limitation and does not show the successful results in case of multivariate data, In higher dimension which leads to the introduction of various discontinuities that is distributed in various areas or as dominant such as edges of the surface or boundary of the surface. After the limitation curvelet transformation was introduced and within the same year shearlet transformation was introduced by Guo, Kutyniok, Labate, Lim and Weiss hence it overcome the limitation of wavelet analysis that are present in multivariate data. It can be claimed as an extension of wavelet

Transformation and it can be derived from the single set of generator or from the finite set of operators and anisotropic features are present in shearlet as it is beneficial in multivariate data, algorithm of wavelet is somehow more time consuming than the algorithm if shearlet transformation or it is considered to provide the fast result. Extension of wavelet transformation can be termed as Shearlet transformation. They are directional sensitive, crucial in multidimensional data. They are constructed by parabolic. They not only high level of mathematical structure as same as wavelets but also contain the following property i.e. the directional wavelets, the complex wavelets, ridgelets and the contourlets, curvelets.

Continuous shearlet system and continuous shearlet transformation:

Continuous shearlet system: The analysing operator must consist of a waveform with the support of anisotropic utilize the family of dilation operator $D_{A_a}, a > 0$ and $A_a = \begin{pmatrix} a & 0 \\ 0 & a^{1/2} \end{pmatrix}$ and it corresponds to parabolic scaling (dilation corresponds to scaling [38]), parabolic scaling is taken into consideration in order to have a n optimally sparse approximations. Next, we need to change the orientation of the waveform (not rotational, because it may end up by destroying the structure of the lattice), Hence shearing operator is used given by $\{D_s; where\ s \in \mathbb{R}\}$ and shearing matrix is defied by $S_s = \begin{pmatrix} 1 & s \\ 0 & 1 \end{pmatrix}$. Standard T_t is used as a translation operator [39] and the combination of the above three operators, we can define the continuous shearlet system.

Continuous shearlet transformation: Function $f \in L^2(\mathbb{R}^2)$ corresponding to the continuous shearlet transformation map can be stated as $f \to SH_\psi^c f(a,s,t) = < f, \sigma(a,s,t)\psi >$, where $t \in \mathbb{R}^2 and\ s \in \mathbb{R}$.

Discrete shearlet system and discrete shearlet transformation

Discrete shearlet system: Various ideas was taken into consideration in older to form the orthonormal
basis of $L^2(\mathbb{R}^2)$, co-orbit theory was taken into consideration ,. A discrete wavelet system irregular with ψ and Λ is associated with $\psi \in L^2(\mathbb{R}^2)$ and $\Lambda \subseteq S$ can be written as

$$SH^d_{\psi,\Lambda} = \{a^{\frac{-3}{4}}\psi(A_a^{-1}S_s^{-1}(\cdot - t); a, s, t \in \Lambda\} \quad (5)$$

Discrete shearlet transformation: The transformation can be associated can be described as all $f \in L^2(\mathbb{R}^2)$ such that

$$f \to SH^d_\psi f(j,k,m) \; where \; j,k \in \mathbb{Z} \; and \; m \in \mathbb{Z}^2 \quad (6)$$

Conclusion:

In this paper we have gone through the theory of wavelet and how it has a application on image processing and reviewed the work that is carried in image denoising, image compression, wavelet has many application such as signal processing and image processing and discuss the limitation of wavelet analysis and basics of shearlet transformation and its type which proves that it is very important in coming future.

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PLC VE SCADA KULLANILARAK BİR ORCİK ÜRETİM SİSTEMİNİN OTOMASYONU

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Özet

Orcik, Elazığ yöresinde üzümden ya da duttan elde edilen şıranın un ve özel bir toprakla bulamaç haline getirilip ceviz dizili ipin bu bulamaca istenilen kalınlığa göre bir veya daha fazla kez batırılıp güneşte kurutulmasıyla elde edilen yöresel bir üründür. Bu çalışmada, Türkiye'de tüketiminin yanısıra Avrupa ülkelerine de ihraç edilen orciğin fabrika otomasyon sistemi ile üretimine yönelik bir benzetimi yapılmıştır. Doğal klasik yöntemlerle üretilen orciğin her bir üretim aşaması ele alınarak Programlanabilir Mantıksal Denetleyici (PLC) otomasyon sistemi ile tasarımı yapılmış ve SCADA üzerinde benzetimi gerçekleştirilmiştir. Tasarlanan sistemle, orcik üretiminin klasik yöntem yerine PLC tabanlı otomasyon sistemine geçişi amaçlanmıştır.

Elektrikli makineler, hızla büyüyen otomasyon hızının bir sonucu olarak sektörün bir parçası haline gelmiştir. Geleneksel endüstriyel işlemler makinelerin manuel çalıştırılmasıyla olur ve bu işlemler manuel müdahaleye bağlıdır. Bu süreç zaman alıcı ve pahalıdır. Endüstrilerdeki yönlendirme görevlerinin otomatikleştirilmesi verimliliği arttırır. Minimal insan müdahalesiyle PLC gibi otomasyon araçları kullanılarak tekrarlayan sürecin otomasyonu, geliştirilmiş verim, azaltılmış işletme maliyetleri, geliştirilmiş üretim hacimleri, daha iyi kalite kontrol ve endüstriyel güvenlik sağlanır [1].

Anahtar kelimeler: PLC, SCADA, Orcik üretimi.

Summary

Orcik is a local product obtained from grape or berry in Elazığ region by making the syrup with flour and special soil into a slurry and dipping the string of walnuts into this slurry one or more times according to the desired thickness and drying it in the sun.In this study, a simulation of the production of orcik, which is exported to European countries as well as its consumption in Turkey, was made with factory automation system. The orcik produced by natural classical methods has been designed with programmable logical controller (PLC) automation system taking into consideration each production stage and simulated on SCADA.With the system designed, the transition of orcik production to PLC based automation system instead of classical method is aimed.

Electrical machines have become part of the industry as a result of the rapidly growing pace of automation. Conventional industrial operations happen by manual operation of machines and these operations depend on manual intervention. This process is time-consuming and expensive. Automating routing tasks in industries increases productivity. By using PLC automation tools such as automation of repetitive processes with minimal human intervention, improved efficiency, reduced operating costs, improved production volumes, include better quality control and industrial safety [1].

Keywords: PLC,SCADA, Orcik production.

GİRİŞ

Sistemlerin planlanan sırayla kontrol edilmesini ve gerçek zamanlı gözlemlenmesini sağlayan süreç otomasyon olarak adlandırılabilir. Otomasyon, kontrol sistemlerinin, akıllı elektronik cihazların, yeni iletişim teknolojilerinin iş kalitesini artırmak, sistemin daha iyi izlenmesi ve kontrol edilmesini sağlamak için kullanılmaktadır [2].

Orcik, Elazığ yöresinde üzümden ya da duttan elde edilen şıranın un ve özel bir toprakla bulamaç haline getirilip ceviz dizili ipin bu bulamaca istenilen kalınlığa göre bir veya daha fazla kez batırılıp güneşte kurutulmasıyla elde edilen yöresel bir üründür. Geleneksel orcik şu şekilde yapılmaktadır; toplanan üzümler teknede ezilerek suyu çıkarıldıktan sonra bir gün dinlenmeye bırakılır ve üzüm suyu kazana boşaltılıp odun ateşinde kaynatılır. Kaynayan üzüm suyuna pekmez toprağı katılır. Üzüm şırası ile karıştırılan un süzgeçten geçirilip kazana ilave edilir. Bu süreçte topaklanma olmaması için bulamaç sürekli olarak karıştırılır. Cevizler kırılıp suda bekletildikten sonra ikiye ayrılıp iğne ile iplere dizilir. İpe dizili cevizler istenilen kalınlığı elde edene kadar bulamaca batırılıp çıkarıldıktan sonra asılarak güneşte kurumaya bırakılır. Bu çalışmada yapımı oldukça zahmetli olan orcik yapımı için bir fabrika otomasyon sistemi tasarlanmış ve Denetleyici Kontrol ve veri toplama (SCADA) üzerinde benzetimi gerçekleştirilmiştir.

SCADA sistemi, üretim ve iletim sistemlerini denetler, kontrol eder, optimize eder ve yönetir. Bu sistemlerin ana bileşeni, verileri otomatik olarak toplayan ve doğrudan sensörlere, sayaçlara, kaydedicilere veya süreç ekipmanlarına bağlanan uzak terminal üniteleridir.

Denetim, bir sürece komuta etmek ve çalışmasını denetlemekten oluşur. Bu amaca ulaşmak için, bir sürecin denetim sistemi, süreçle bağlantılı önemli veri kaynaklarını toplamalı, denetlemeli ve kaydetmeli, olası işlev kaybını tespit etmeli ve uyarı vermelidir. Denetim sisteminin temel amacı, sistemi son derece otomatik bir süreci kontrol etme ve yönetme fırsatı vermektir. Bu nedenle, endüstriyel süreçlerin denetimi, bir süreci kontrol etmeyi ve çalışmasını denetlemeyi amaçlayan bir dizi görevi içerir [3].

OTOMASYON SİSTEMLERİNDE PLC KULLANIMI

PLC'ler çok çeşitli otomatik sistemler ve süreçler için kontrol merkezleridir. Ekipmanı kontrol etmek için anahtarları ve röleleri simüle etmek için transistörler ve diğer devre elemanlarını kullanan çoklu girişler ve çıkışlar içerirler. Standart bilgisayar arabirimleri ve özel diller ve ağ seçenekleri ile arabirimlenen yazılımlarla programlanabilirler.

PLC'ler için mevcut girişler arasında DC, AC, analog, termokupl, RTD, frekans veya darbe, transistör ve kesme girişleri bulunur. PLC'lerin çıkışları arasında DC, AC, röle, analog, frekans veya darbe,

transistör ve triyak bulunur. PLC'ler için programlama seçenekleri arasında ön panel, el tipi ve bilgisayar bulunur [4].

Otomasyon sürecinde esneklik ve kolaylık sağlayan PLC sistemin ana parçasıdır. PLC yazılımı ile, kullanıcının basamak mantığı veya başka bir programlama dili kullanarak PLC programının programlanması ve işlemlerin kolay bir şekilde kontrol edilmesi sağlanır. Temel olarak, PLC'ler dahili bir belleğe, giriş/çıkış arayüzlerine, merkezi işlem ünitesine (CPU) ve bir programlama cihazına sahip endüstriyel bir bilgisayara çok benzer. Bir PLC'nin merkezi işlem birimi (CPU), iletişim ve izleme için mikroişlemci, bellek yongası ve kontrol mantığı devresinden oluşur. CPU programı çalıştırmak ve süreci başlatmak için çalışma modunda cihazdan çalışma mantığının yüklenmesi için programlama modunda çalıştırılabilir. PLC programlamayı kolaylaştırmak için birçok uygulama yapılmıştır. Yazılımın kullanımı sadece programın tasarımını tamamlamakla kalmaz, aynı zamanda benzetim ve emülasyon da yapabilir [1].

Dış algılayıcılardan aldığı bilgiyi kendine yüklenen programa göre işleyen ve iş elemanlarına aktaran mikro işlemci tabanlı bir cihaz olan PLC'ler, otomasyon sistemlerinde SCADA sistemi ile uyumlu çalışan sanayi tipi bilgisayarlardır [5].

SCADA SİSTEMİ

Genellikle, SCADA sistemleri sanayide insan kontrolünün pratik olmadığı karmaşık sistemlerin kontrolünü otomatikleştirmek için kullanılır. SCADA, tesislerde sistem kritiğini kontrol eder ve izler. Tipik bir SCADA sistemi, kontrolörler, yazılım, ağlar, iletişim ve donanım giriş/çıkış sinyalinden oluşur. SCADA sistemi ayrıca tanımlı ayarların denetimi için bir temel kontrol fonksiyonu sağlar. SCADA sistemi genellikle etiket veya nokta adı verilen veri öğelerini içeren bir etiket veritabanı olarak adlandırılan dağıtılmış bir veritabanı uygular. Bir nokta, sistem tarafından izlenen veya kontrol edilen tek bir giriş veya çıkış değerini temsil eder. SCADA sistemi endüstrilerde sistemi kolay bir şekilde kontrol etme imkanı sağlar [6].

SCADA sistemleri, tüm endüstri süreçlerini ve tesislerini izlemek ve kontrol etmek için endüstride kullanılan merkezi bilgisayar kontrollü sistemlerdir [7].

SCADA sistemi telemetri ve veri toplama kombinasyonunu ifade eder. Verilerin uygulama alanındaki belirli cihazlar tarafından ölçülmesiyle başlar ve akıllı elektronik cihazlar yoluyla toplanır, daha sonra gerekli işleme ve kontrol algoritmalarını uygulamak için bu verileri bir ana istasyona aktarır. SCADA sistemi dört bileşenden oluşur: enstrümantasyon, uzak istasyonlar, iletişim ağları ve ana terminal ünitesi (MTU)[8].

ORCİĞİN YAPIM AŞAMALARI

Cevizlerin ipe dizilmesi

Orcik yapımı için cevizler kırıldıktan sonra yumuşaması için suda bekletilir. Yumuşayan cevizler ikiye ya da dörde bölünerek Şekil 1'de görüldüğü gibi iğne ile ipe dizilir.

Şekil 1. Cevizlerin ipe dizilmesi [9]

Üzümlerin sıkılması

Üzümler teknede ezilip suyu çıkarılarak bulamaç yapımı için hazır hale getirilir. Bulamaç yapımı için hazırlanmış üzüm suyu Şekil 2'de görülmektedir.

Şekil 2. Bulamaç yapımı için hazırlanmış üzüm suyu [9]

Bulamaç pişirilmesi

Şekil 3'te görüldüğü gibi üzüm suyu kazana boşaltılıp odun ateşinde kaynatılır. Kaynayan üzüm suyuna pekmez toprağı katılır. Üzüm şırası ile karıştırılan un süzgeçten geçirilip kazana ilave edilir. Bulamaç kıvamını alana kadar sürekli olarak karıştırılır.

Şekil 3. Bulamacın ateşte pişirilmesi [9]

İpe dizili cevizlerin bulamaca batırılması

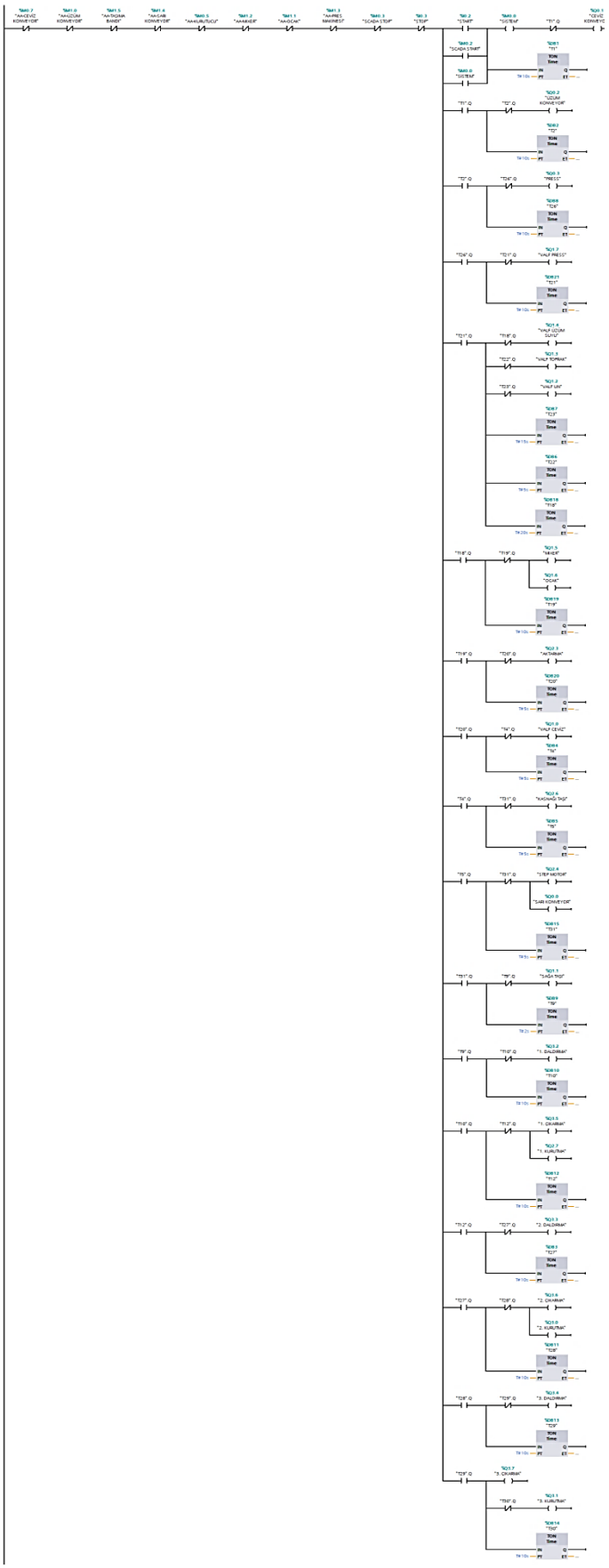
Hazırlanan bulamaca ipe dizilen cevizler istenilen kalınlığı elde edene kadar bulamaca batırılıp çıkarıldıktan sonra asılarak Şekil 4'te görüldüğü gibi güneşte kurumaya bırakılır.

Şekil 4. Orciğin güneşte kurumaya bırakılması [9]

ORCİK YAPIMININ OTOMASYON SÜRECİ

Orcik makinesi otomasyon sistemi için TIA PORTAL üzerinde ladder diyagramı PLC programlama dili kullanılmıştır. Sistemin PLC kodu Şekil 5'te görülmektedir.

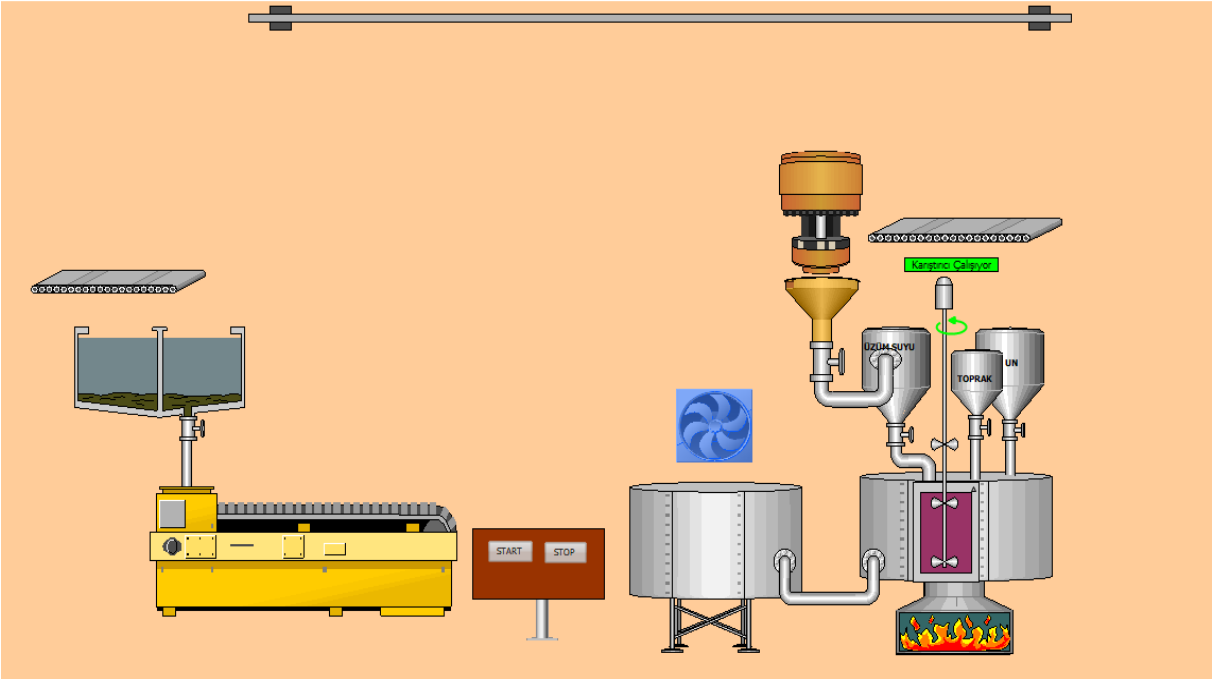
Otomasyon sürecinin çalışması şu şekildedir; Sistemde Start butonuna basıldığında ceviz konveyörü çalışır ve cevizler su dolu süzgeçli kaba boşaltılır. Daha sonra üzüm konveyörü çalışarak üzümler pres makinesine aktarılır ve pres makinesi çalıştırılır ve elde edilen üzüm suyu bir hunide birikir. Huninin selenoid valfi açılarak üzüm suyunun siloya aktarımı sağlanır. Karıştırma kazanına istenilen miktarlarda üzüm suyu, pekmez toprağı ve un aktarılması için üzüm suyu, pekmez toprağı ve un silolarının selenoid valfleri belirlenen süreler boyunca açık bırakılır. Ocak yakılır ve bulamacın pişirilme süresi boyunca karıştırma makinesi çalıştırılır. Bulamaç piştikten sonra batırma kabına aktarılır. Süzgeçli su kabında süzülen cevizler kasnağa dizim işlemi yapılacak konveyörün deposuna aktarıldıktan sonra konveyör çalıştırılıp kasnak aşağı indirilir. Kasnağın aşağı yukarı hareketi için step motoru çalıştırılır. Ceviz dizili kasnak bulamaç dolu batırma kabına 3 kez batırılıp çıkarılır ve her defasında kurutma işlemi yapılır. Stop butonuna basıldığında ya da sistemde herhangi bir arıza olması durumunda sistem durur.



Şekil 5. Orcik makinesi otomasyon sisteminin PLC kodu

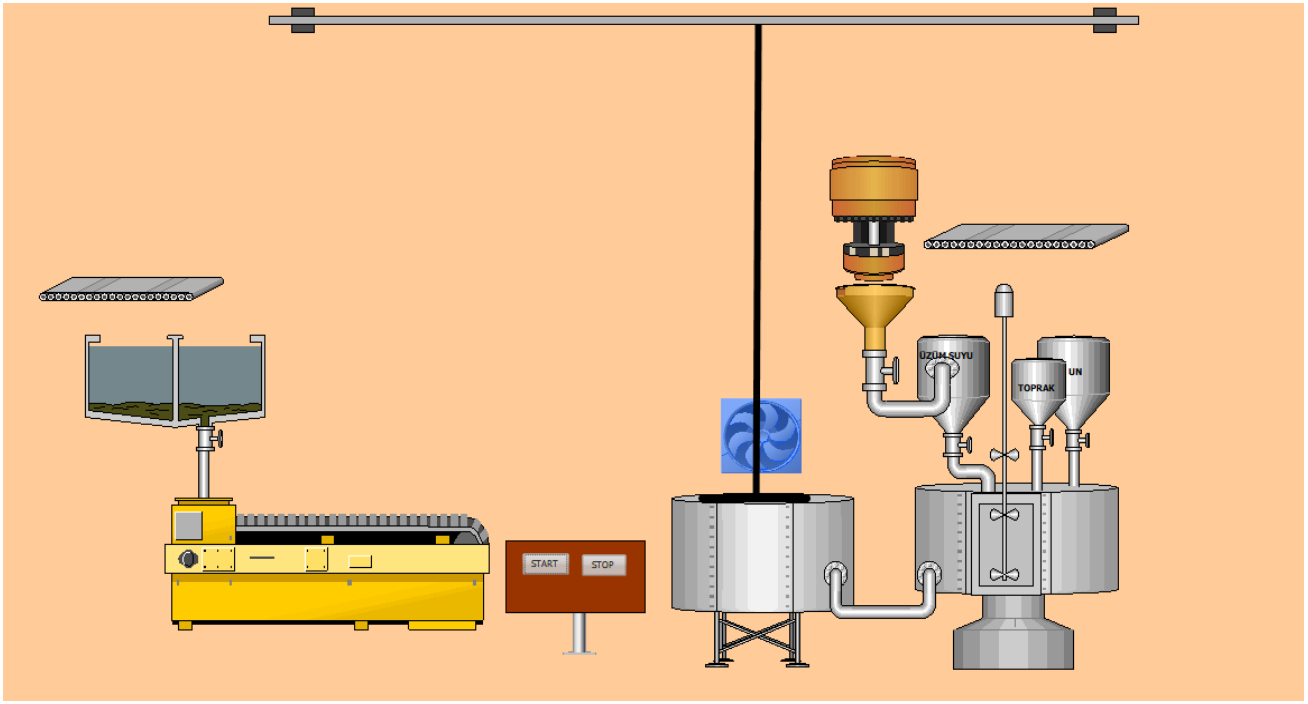
Orcik Yapımının SCADA benzetimi

Start butonuna basıldığında cevizler konveyör üzerinden süzgeçli kaba boşaltılmaktadır. Cevizler su kabında süzülerek dizim işlemine hazır hale gelmektedir. Bulamaç yapımı için gerekli olan üzüm suyunu elde etmek için üzümler konveyör üzerinden pres makinesine boşaltılıp pres makinesi çalıştırılmaktadır. Pres makinesinden geçirilen üzümlerin suyu hunide depolanıp daha sonra siloya aktarılmaktadır. Bulamaçın hazırlanması için karıştırma kabına üzüm suyu, un ve özel toprak bulunan siloların valfleri belirlenen süreler boyunca açılır. Daha sonra pişirmek için ocak yakılır. Pişirme sırasında bulmaçın topaklanmaması için pişme süresince sürekli olarak karıştırılır (Şekil 6).

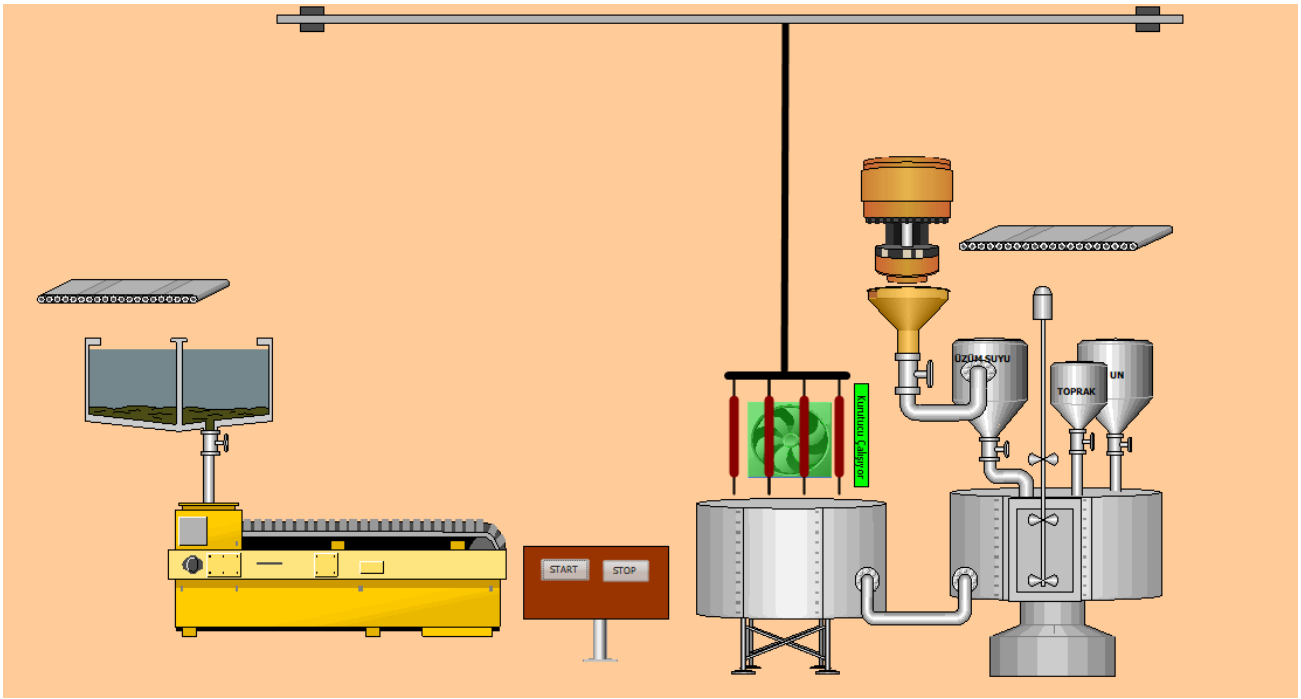


Şekil 6. Ocağın yanması ve karıştırıcının çalıştırılması işlemi SCADA ekranı

Daha önce yumuşaması için suda bekletilen cevizler süzülerek dizim işlemi yapılacak konveyörün deposuna boşaltılır. Konveyör çalıştırılıp kasnak aşağı indirilir. Kasnağın aşağı yukarı hareketi için step motoru çalıştırılır. Kasnağa dizilen cevizler bulamaç dolu batırma kabına 3 kez batırılıp çıkarılır ve her defasında kurutma işlemi yapılır (Şekil 7,8).



Şekil 7. Kasnağın bulamaça batırılması işlemi SCADA ekranı



Şekil 8. Kasnağın bulamaçtan çıkarılması ve kurutucunun çalıştırılması işlemi SCADA ekranı

SONUÇ

PLC günümüzde yaygın olarak kullanılmaktadır ve otomasyon sektöründe önemli bir rol oynamaktadır. Düşük maliyet ve yüksek güvenilirlik avantajları nedeniyle, birçok otomasyon makinesi PLC kullanmayı tercih etmektedir. SCADA, izleme sistemi için çok amaçlı yardımcı yönetim ve işletim esnekliği sağlar [4]. Bu çalışmada, orcik yapımının PLC-SCADA tabanlı bir otomasyonu sunulmuştur. Doğal klasik yöntemlerle üretilen orciğin her bir üretim aşaması ele alınarak PLC otomasyon sistemi ile tasarımı yapılmış ve gerçek bir PLC olmadan PLCSIM programı kullanılarak SCADA üzerinde benzetimi gerçekleştirilmiştir. Orcik yapımının klasik yöntemle yapım aşamaları ele alınıp orcik yapımı otomasyon sistemi tasarlanarak üretim sürecinin otomatik hale getirilmesi amaçlanmıştır. Sistemin tasarımı yapılıp benzetimi üzerinden sürecin düzgün çalıştığı gözlemlenmiştir. Tasarımın kod aşaması tamamlandıktan sonra mekanik kısmı ve montaj işlemi de yapılarak endüstride orcik üretim makinesi olarak kullanılabilir.

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PYROLYSIS MODELING OF WASTE-DERIVED FUEL THROUGH COMBINED THERMODYNAMIC AND KINETIC SIMULATIONS

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Abstract

The pyrolysis modeling of waste-derived fuels has been performed by combining thermodynamic as well as kinetic model. Thermodynamic modeling of pyrolysis for waste-derived fuel gives only stable species so the end-product does not contain unstable species that should appear in waste-derived fuel pyrolysis. So in this study, the pyrolysis model is developed by combining two computational codes; HSC Chemistry for thermodynamic and Perfectly Stirred Reactor (PSR) for kinetic simulations. Integrated effects of thermodynamic, as well as kinetic phenomena, results in a precise prediction of the pyrolysis products. The simulation principle adopted in this work is to first calculate the gaseous products by thermodynamic analysis software HSC Chemistry. Then, these gaseous products are introduced into the Sandia PSR code to include the potential constraints of kinetics involved in the pyrolysis and finally to get the distributions of volatile gases including tar compounds consistent with the realistic situation. The simulation model is solved within the temperature range of 400 °C to 1200 °C for studying the effect of temperature on the composition and quality of volatile gases including tar compounds from waste-derived fuel pyrolysis. The product gas and tar compounds generated for dried sewage sludge and plastic waste are compared at different temperatures. The products gas obtained from HSC calculations of waste-derived fuel is mainly H2, CO, CO2, CH4. After introducing these products into the PSR program, the final products obtained are H2, CO, CO2, CH4, C2H2, C2H4, C2H6, and C3H8 and a few higher hydrocarbon compounds that are more realistic products in the waste-derived fuel pyrolysis.

Keywords: Pyrolysis, Fluidized bed, Simulation, Volatile gases, Tar.

INTRODUCTION

Waste materials are environmental burden substance as it poses a serious threat to the environment during its disposal. On the contrary, those can be converted to gaseous or liquid fuel through thermochemical conversion (Banu et al. 2020). The thermochemical conversion process can be broadly categorized as pyrolysis, gasification, and combustion. While the main objective of combustion is to produce heat, the pyrolysis and gasification process primarily produces syngas which is a mixture of H_2, CO, CO_2, and light hydrocarbons. This syngas may be converted into liquid fuels, pure hydrogen, and power (Guan et al., 2018). Though combustion is comparatively mature technology than pyrolysis and gasification, they have a few advantages over combustion. The pyrolysis and gasification process has better energy efficiency and low pollutant emissions characteristic over combustion. Being a low-temperature process, pyrolysis and gasification plants incur lower plant maintenance costs and longer lifetime. Generally, three types of gasifiers are employed for the pyrolysis and gasification process, i.e., fixed-bed, fluidized-bed, and entrained-bed gasifiers. (Das and Datta, 2016). Each type of gasifier has a set of advantages and disadvantages and is selected based on the fuel characteristic (Das and Datta, 2014). The major characteristic parameter for gasifiers is temperature, ash condition, oxidant demand, and fuel feed size. Among them, temperature plays a significant role in pyrolysis and gasification performance. The experimental work by Inguanzo et al. (2002) for the pyrolysis of sewage sludge discussed the effect of temperature on the composition of the gaseous product. Their experimental result showed that an increase of pyrolysis temperature decreases solid fraction and increases the gas fraction. Experimental study by Grammelis et al. (2009) showed the pyrolysis characteristic of waste recovered fuel. They determined the kinetic parameters governing the devolatilization

behavior of the primary components and the composite wastes by thermogravimetric analysis. A similar approach of thermogravimetric method was adopted by Yan et al. (2005) to study the effect of temperature on the pyrolysis product gas distribution from biomass pyrolysis. It was observed from the experimental results that different reaction pathways are involved in producing different profiles of gas produced at high and low temperatures.

However, an experimental study to find the pyrolysis product of waste-derived fuel is a resource-intensive exercise that necessitates highly reliable measurement. On the other hand, a suitable model of pyrolysis can predict the pyrolysis product with high accuracy with fewer resources. Two different types of models are adopted in pyrolysis modeling; Thermodynamic modeling and Kinetic modeling. The thermodynamic equilibrium model is independent of the reactor geometry. Also achieving the thermodynamic equilibrium particularly at low temperatures may not be possible so the calculations may not represent the real situation when kinetic constraints become the major factor. However, the thermodynamic equilibrium model has been widely used to model pyrolysis of coal, biomass, methane plastic, and other waste fuel by several researchers (Gueret et al. 1997; Fink 1999; Zainal et al. 2001; Li et al. 2001). Philippe and Raphael (2002) developed a thermodynamic model for biomass gasifier using ASPEN PLUS software. Their model is based on the minimization of Gibbs free energy at equilibrium. This is possible by assuming that the residence time is long enough to allow the chemical reactions to reach an equilibrium state. However, this assumption of equilibrium is rarely reached in real gasifiers.

The Kinetic model is based on the kinetic rates of reaction so a detailed kinetic reaction mechanism is used to calculate the final pyrolysis product. Baumlin et al. (2005) used a continuous self-stirred tank reactor (CSSTR) or perfectly stirred reactor (PSR) for biomass gas pyrolysis. They validated the model result with the experimental results obtained on the thermal cracking of vapors produced by biomass pyrolysis. The reactor network model by Stark et al. (2015) also used a kinetic model to predict the pyrolysis product from biomass. They found that a perfectly stirred reactor with detailed chemical kinetic can model the pyrolysis process of biomass. Grammelis et al. (2009) also developed a kinetic model of pyrolysis for waste recovered fuel for validating their experimental work. The major shortcoming of the thermodynamic or kinetic model is that if they are used individually they can not predict precisely the gaseous product including unstable species like C_2H2, C_2H_4, C_2H_6, and C_3H_8 and a few higher hydrocarbon compounds that actually appear in waste-derived fuel pyrolysis. So Lee et al. (2007) developed a pyrolysis model by combining the kinetic and thermodynamic model for predicting gaseous products from biomass pyrolysis. Das et al. (2020) and Das (2020) also used a similar approach of combined kinetic and thermodynamic simulations methods for pyrolysis modeling of woody biomass. They predicted gaseous products and tar from woody biomass pyrolysis with high accuracy.

In the present study, a reactor network model (RNM) is developed for the pyrolysis zone of the gasifier. Two computation codes; HSC Chemistry for thermodynamic and Perfectly Stirred Reactor for kinetic simulations of the pyrolysis process are used for pyrolysis modeling. Integrated effects of thermodynamics, as well as kinetic phenomena, results in a precise prediction of the pyrolysis products. The simulation model is solved within the temperature range of 400 °C to 1200 °C for studying the effect of temperature on the composition and quality of volatile gases including tar compounds from refuse-derived fuel pyrolysis. The product gas and tar compounds generated for dried sewage sludge and plastic waste are compared at different temperatures.

MATERIALS AND METHODS

The present model is developed for the pyrolysis of waste-derived fuel. The fuel primarily gets pyrolyzed immediately after entering the thermodynamic model. Then the primary pyrolysis product reacts in the kinetic model to produce the final pyrolysis product after secondary pyrolysis.

An equivalent reactor network (ERN) has been developed to calculate the devolatilization product. The reactor network model (RNM) is solved for primary and secondary pyrolysis. The pyrolysis zone has been considered as a combination of a thermodynamic and kinetic model. Integrated effects of two computation codes; HSC Chemistry for thermodynamic and Perfectly Stirred Reactor (PSR) for kinetic simulations of the pyrolysis process are used for precise prediction of the pyrolysis products.

The thermodynamic equilibrium calculation for the simulation of the devolatilization process has been done with the HSC Chemistry tool. During the evaluation of equilibrium gas composition, the Gibbs free energy has been minimized using the GEMINI code. For a closed system with N species, the Gibbs free energy (G) is expressed according to,

$$G = \sum_{i=1}^{N} n_i\left(\mu_i^0 + RT \ln \alpha_i\right)$$

Where, ni, μi, and αi are the molar amount, standard chemical potential, and activity of species i. The species considered during the equilibrium calculation are H, H_2, C, CO, CO_2, CH_4, HCN, NH_3, C_2H_2, C_2H_6, C_2H_4, C_3H_8, N, N_2, NO, N_2O, O, O_2, H_2O, H_2O_2, HO_2, NO_2, NO_3. While the amount of C, H_2, O_2, and N_2 have been considered as inputs (i.e. C = 1 mol; H_2 = 0.6983 mol; O_2 = 0.1961 mol and N_2 = 0.0099 mol for dried sewage sludge and C = 1 mol; H_2 = 0.8868 mol; O_2 = 0.0545 mol and N_2 = 0.0011 mol for plastic waste), the rest of the species are considered in the devolatilization product. This product gas further enters a perfectly stirred reactor (PSR) as the equilibrium model alone can't predict all the tar components present in the final pyrolysis product.

In the PSR, the mixing rates are considered to be very fast and the chemical conversions from the reactants to the products are controlled by the rates of the kinetics of reactions. The Modelling of pyrolysis PSR has been done by solving a system of nonlinear differential-algebraic equations using ANSYS Chemkin-Pro package–to evaluate the species concentrations within the reactor considering homogeneous reactions in the gas phase. The equations are solved by the damped modified Newtown algorithm. The mathematical details of the perfectly stirred reactors used in the present work may be found in (Glarborg et al., 1986; Turns, 1996). The kinetic mechanism used for solving PSR is taken from our previous work (Das et al., 2020).

The simulation of the entire pyrolysis process has been performed at atmospheric pressure and temperatures of 660 °C. The total height and the internal diameter of the gasifier are considered as 0.4 m and 3.8 m respectively. The pyrolysis volume is around 2 % of the total gasifier which is calculated by scale analysis.

RESULTS AND DISCUSSION

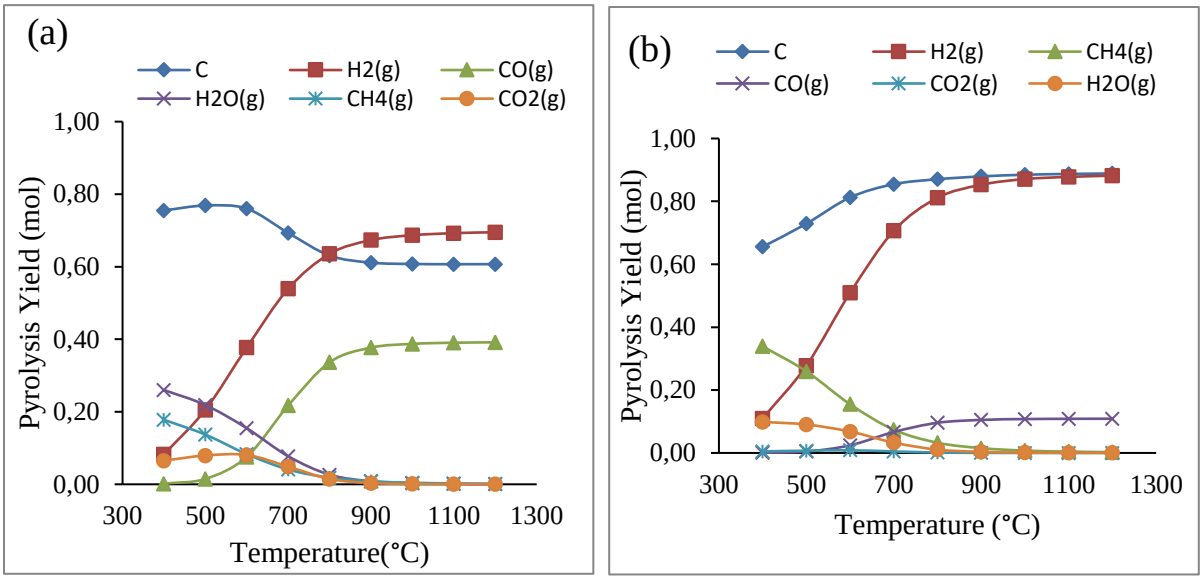

Fig. 1: Pyrolysis HSC result for (a) Sewage Sludge ; (b) Plastic Waste

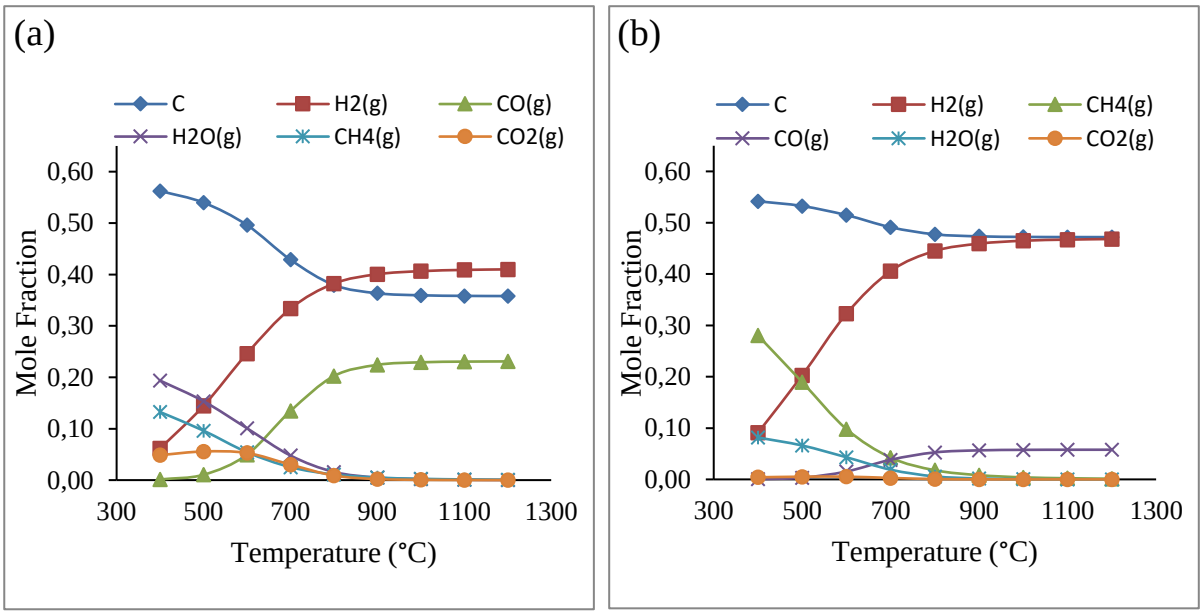

Fig.2: HSC result (Mole Fraction) for (a) Sewage Sludge (b)Plastic Waste at different temperature

The temperature of a pyrolysis process is generally controlled by the fuel feed rates and the temperature is proportional to the fuel feed rate. Correspondingly, the temperature distribution significantly affects pyrolysis performance or quality of the volatile products and the concentration of tar components. The major gaseous products obtained from dried sewage sludge and plastic waste pyrolysis in the temperature

range of 400–1200° C are CO, H2, CO2, and CH4. Figure 1(a) and 1(b) shows that the pyrolysis yield (mol) of CO, and H_2 increases with the increase of temperature whereas the pyrolysis yield of CO_2 and CH_4 decreases with the increase of temperature.
It is observed in Fig. 2(a) and 2(b) that carbon mole fraction decreases with the increase of temperature up to a certain temperature. After that, the mole fraction of carbon becomes constant for both the fuel. After 1000° C the curve for carbon becomes a straight line. It indicates that total carbon in fuel has two-part. One is volatile carbon and the second one is fixed carbon. During the pyrolysis process, only the volatile carbon reacts to form volatile gases. It is the fixed carbon of fuel that remains constant after 1000° C.

If the pyrolysis process is divided into different temperature zone; it is observed from the fig. 1(a), 1(b), 2(a), and 2(b) that the waste fuels first get dehydrated up to 560° C temperature. Along with the water vapor, the CH4 and CO2 are also reduced in this temperature zone. In the next temperature zone of 560 to 900°C, H_2 and CO increase sharply. After 900°C pyrolysis reaches the end. Almost no reaction occurs after this temperature. The contents of H_2 and CO remain stable and high. Carbon residue present here is regarded as charcoal. Similar nature of devolatilization product was also observed by Lee et al. (2007) for biomass pyrolysis.

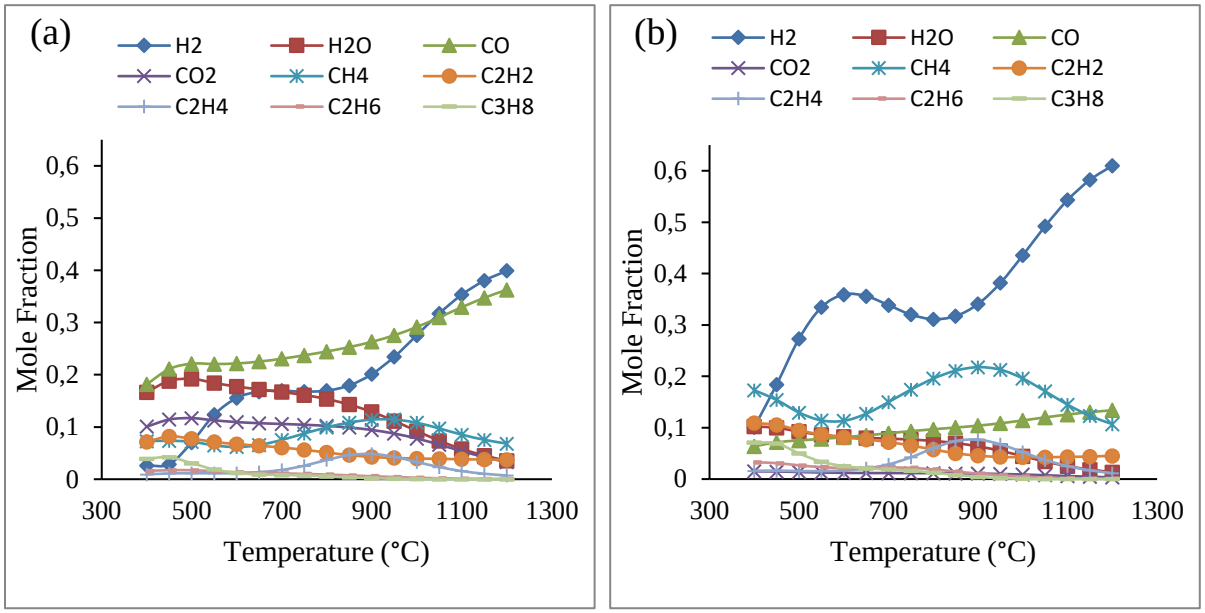

Fig. 3: Pyrolysis(PSR) result for (a) Sewage Sludge ; (b) Plastic waste.

The kinetic model of pyrolysis product yields unstable species like C2H2, C2H4, C2H6, C3H8, and few higher hydrocarbon as shown in Fig. 3 (a) and 3 (b). These unstable species should be actually produced when waste-derived fuel is pyrolyzed. The new species (C2H2, C2H4, C2H6, C3H8, and few higher hydrocarbon) observed in the kinetic model are in the range of 11–12% mole fractions and they are obtained with the expense of the amount of all original components of HSC pyrolysis. These newly generated species show more realistic pyrolysis products. So Combining the thermodynamic model with the kinetic model is very important to calculate the realistic pyrolysis products from waste-derived fuel.

The HSC Chemistry results, shown in fig. 1(a), 1(b), 2(a) and 2(b) do not consider kinetics (rates) of the chemical reactions and nonideality of solutions. So the calculation does not give the reaction time that is

necessary for the theoretical equilibrium state to be reached. As the HSC calculation merely represents the compositions of pyrolysis in its most stable state, the end products (H2, CO, CO2, CH4, and H2O) do not contain unstable species like C2H2, C2H4, C2H6, and C3H8 which should appear in waste-derived fuel pyrolysis. Therefore, the integrated effect of a combined thermodynamic and kinetic model is meaningful for precise prediction of gaseous product distribution from waste-derived fuel pyrolysis.

CONCLUSION

A reactor network model (RNM) is solved for the pyrolysis zone of the gasifier by combining the thermodynamic and kinetic models. Two computation codes; HSC Chemistry for thermodynamic and Perfectly Stirred Reactor (PSR) for kinetic simulations of the pyrolysis process are used for pyrolysis modeling. The primary pyrolysis is modeled as a thermodynamic model and secondary pyrolysis as a kinetic model.

The following conclusions can be drawn from the study.

- The Devolatilization products obtained from HSC calculations of waste-derived fuel is mainly H2, CO, CO2, CH4, and a few amounts of C2+ hydrocarbons.
- H2, CO, CO2, CH4, C2H2, C2H4, C2H6, and C3H8 and a few higher hydrocarbon compounds can be obtained by combining the thermodynamic model with the kinetic model for pyrolysis.
- The combined effect of the thermodynamic and kinetic model of pyrolysis produces realistic products from waste-derived fuel.

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DIABETES UNAWARENESS IN PATIENTS HOSPITALIZED IN THE INTERNAL MEDICINE CLINIC

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Abstract

Introduction

Diabetes Mellitus is a significant cause of mortality and morbidity by leading to microvascular and macrovascular complications.This can be prevented through early diagnosis of diabetes and achieving glycemic control. This study has searched for DM diagnosis rate as found through HbA1c measurements in the inpatient population.

Material and Methods

This retrospective study includes all in-patients whose HbA1c levels were measured at the Internal Diseases Clinic of Fatih Sultan Mehmet Training and Research Hospital in 2015. Glucose, fasting glucose levels, age, and gender were recorded. The patients, who have an HbA1c value of 6.5 or more, were defined as newly diagnosed DM. The patients were included in three groups as those with a previous diabetes diagnosis, those with a new diabetes diagnosis, and those with no diabetes diagnosis.

Results

Among 1057 patients included in the study, 29.7% have past diabetes diagnosis (Group 1), 7,5% were newly diagnosed diabetes, while 62.8% have no diabetes. No statistically significant difference was found in terms of age, and gender distribution. No significant difference was found between the HbA1c, fasting glucose, and random glucose levels of Group 1 and Group 2.

Discussion

New DM diagnosis rate was found as 7.5% among the patients admitted to the clinic of internal disease within a year. Besides, in the high-risk population of inpatients, the routine HbA1c measurement may lead to early diagnosis by increasing the undiagnosed patient rate.

Conclusion

Diabetes unawareness is common in inpatients. Diabetes screening with HbA1C measurement in inpatients may be an opportunity to detect unknown diabetes.

Keywords: Diabetes, Diabetes Unawareness Diabetes, HbA1c, inpatient

INTRODUCTION

With the increase in obesity and physical inactivity, diabetes has become one of the most important public health problems all over the World (Volaco et al., 2018). The prevalence of diabetes has doubled in the last 30 years and is expected to increase further in the following years(Chen et al., 2012). According to the report published by the International Diabetes Foundation in 2019, there are 357.1 million diabetic patients between the ages of 20-65 and 135.6 million diabetic patients between the ages of 65-99 and 90-95% of them are Type 2 Diabetes patients (International Diabetes Foundation, 2019). Macrovascular and microvascular complications can be prevented with early diagnosis and treatment (Turner, 1998) (Duckworth et al., 2009).

Up to 38-67% of diabetic patients have diabetes unawareness (International Diabetes Foundation, 2019). Diabetes screening with HbA1C in hospitalized patients may be an opportunity to detect unknown diabetes. Diabetes screening with HbA1C in inpatients may be an opportunity to detect unknown diabetes. HbA1C is an easily applicable test that does not require fasting and is not affected by glycemic variability ("Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes-2020," 2020) . In this study, it was aimed to determine the rate of detection of new diagnosis diabetes by examining HbA1C in patients hospitalized in the Internal Diseases Clinic. At the same time, it was aimed to evaluate whether there is a difference in HbA1C, fasting glucose and random glucose values between those with known diabetes and unknown diabetes.

MATERIALS AND METHODS

Patients who received inpatient treatment in Fatih Sultan Mehmet Hospital Internal Medicine Clinic between 01.01.2015 and 31.12.2015, who were over the age of 18 and whose data in the hospital automation system were accessible were included in the study. As a result of the retrospective examination of the patients' files, those without known diabetes were diagnosed with new diabetes when HbA1c was 6.5 and above. Patients were divided into 3 groups as previously diagnosed with diabetes, newly diagnosed with diabetes, and without diabetes. The 3 groups were compared in terms of age, gender, HbA1C, fasting glucose and random glucose values. The HbA1C test was tested with the Trinity Biotech Premier Hb9210 device using the boronate affinity HPLC method. The test has been standardized with the reference method of IFCC (International Federation of Clinical Chemistry and Laboratory Medicine). Patient groups; They were compared in terms of age, gender, HbA1c, random glucose and fasting glucose.

When evaluating the findings obtained in the study, IBM SPSS Statistics 22 for statistical analysis (SPSS IBM, Turkey) program is used. While evaluating the study data, the suitability of the parameters to the normal distribution was evaluated with the Shapiro Wilks test. While evaluating the study data, descriptive statistical methods (mean, standard deviation) as well as the Oneway Anova test for comparing normally distributed parameters between groups and the Tukey HDS test to determine the group that caused the difference. Kruskal Wallis test was used for intergroup comparisons of parameters that did not show normal distribution, and Mann Whitney U test was used to identify the group that caused the difference. The Chi-Square test was used to compare qualitative data. Significance was evaluated at the $p < 0.05$ level.

RESULTS

29.7% of 1057 patients had a previous diagnosis of diabetes (Group 1), 7.5% were newly diagnosed during hospitalization (Group 2), 62.8% did not have diabetes (Group 3). The distribution of the groups in terms of age and gender was similar (respectively, p = 0,684 and p = 0,872) (Table 1).

Table 1. Comparison of age and gender characteristics of groups

	Group 1	**Group 2**	**Group 3**	**p values**
Age (mean±SD)	69,23±14,72	69,91±16,61	68,43±19,44	**[1]0,684**
Gender (n,%)				

Male	154 (49%)	41 (51,9%)	335 (50,5%)	[2]**0,872**
Female	160 (51%)	38 (48,1%)	329 (49,5%)	

The comparisons of HbA1C, random glucose, fasting glucose levels between the groups are shown in Table-2. The statistical differences between the groups were determined (respectively, p = 0.001, p = 0.001, p = 0.001, p = 0.002 and p = 0.003). P values obtained as a result of comparison among the groups are shown in Table-2. The mean HbA1c values of the Group 1, Group 2 and Group 3 were 7.7 ± 2.1, 7.88 ± 2.31 and 5.62 ± 0.42 (5.6), respectively. Random glucose mean value was highest in Group 2 with 224,34, followed by Group 1 with 211,99 and Group 3 with 122,50 respectively. Fasting glucose mean value was the highest in Group 1 with a mean of 156.35 ± 79.72. Group 2 fasting glucose mean value was 149.56 ± 69.48, whereas fasting glucose value of group 3 was 102.35 ± 32.90.

Table 2. Comparison of laboratory findings of groups

	Group 1 mean±SD (median)	Group 2 mean±SD (median)	Group 3 mean±SD (median)	p	p1	p2	p3
HbA1C	7,7±2,1 (7,1)	7,88±2,31 (6,8)	5,62±0,42 (5,6)	0,001	>0,05	0,001	0,001
Random glucose	211,99±136,16 (173,5)	224,34±179,72 (153)	122,50±36,51 (115)	0,001	>0,05	0,001	0,001
Fasting glucose	156,35±79,72 (133,5)	149,56±69,48 (130)	102,35±32,90 (95)	0,001	>0,05	0,001	0,001

DISCUSSION

In this study, the rate of unknown diabetes in patients hospitalized in the Internal Diseases clinic within 1 year was found to be 7.5%. No difference was found in terms of age and gender among those with known diabetes, newly diagnosed diabetes, and those without diabetes. There was no difference in HbA1C, fasting glucose and random glucose between those with known diabetes and newly diagnosed diabetes.

In the TURDEP-2 study conducted in the general population in our country, the rate of unknown diabetes among those with diabetes is 55%(Satman et al., 2011). It is thought that the reason for the higher awareness of diabetes in our study is the more frequent hospital admissions due to the greater comorbidity in the inpatient population.

Valentine et al. found that the prevalence of undiagnosed diabetes was 11% and suggest that HbA1c screening test can be used for detecting undiagnosed diabetes in hospitalized patient(Valentine et al., 2011). Valentine et al. also reported that the frequency of undiagnosed diabetes was increased with age. Increasing incdence of diabetes with age can cause that finding. In TURDEP study, a positive correlation was found to be between the frequency of diabetes and age(Satman et al., 2002). In present study, we didn't find any differences in age and sex between patients having history of diabetes and patients newly diagnosed with diabetes.

In the study conducted by Jones D et al in which 348 patients with hyperglycemia were included, 14% of the patients were newly diagnosed with diabetes(Jones et al., 2016). When patients with a previous diagnosis of diabetes were evaluated, it was seen that no HbA1c was checked in 29% of these patients during their hospitalization. This shows that HbA1c is used less than necessary in patients with diabetes.

CONCLUSION

In conclusion, diabetes screening with HbA1C measurement in hospitalized patients may be an opportunity to detect unknown diabetes.

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COMPUTATIONAL INVESTIGATION OF WAVY CARBON NANOTUBE REINFORCED POLYMER COMPOSITES

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Abstract

Carbon nanotubes are nano-shaped materials that are widely utilized now-a-days in composite reinforcement because of their novel characteristics. They are used not only for their high electrical and thermal conductivity but also for their excessively high tensile strength, high elasticity, high flexibility and low weight. The paper aims at analyzing the impact of carbon nanotube's waviness and its mechanical characteristics. In this paper, single-walled carbon nanotubes have been generated as a finite element model and their shear and elastic modulus (transverse and longitudinal directions) have been calculated with adjustments in the carbon nanotube's waviness and diameter. Here, the carbon nanotube has been viewed as a structure similar to a frame. Polystyrene having the modulus of elasticity 3.14 GPa has been utilized in the case of the composite matrix. Simultaneously, for all nanocomposites, 2.4% volume fraction has been utilized. The research work has been performed for aligned carbon nanotubes for evaluating the impact of carbon nanotubes in the composite. It has been found that the shear modulus and the elastic modulus of composite tend to decrease with the increment of waviness ratio. Meanwhile, transverse and longitudinal shear modulus decrease up to 12.25% and 8.1% respectively with the presence of interface material. Moreover, maximum 14.4% and 64.2% decrement of transverse and longitudinal elastic modulus respectively have been identified whenever the interface material is present. On the other hand, a tendency of increment of the shear modulus and the elastic modulus has been noticed with the increment of volume fraction of carbon nanotubes. It has been noticed that transverse and longitudinal shear modulus increase up to 1.49 times and 2.11 times respectively in comparison to the pure matrix of polymer at 9% volume fraction. In addition, maximum 1.64 times and 11.63 times increment from the pure matrix of polymer have been noticed for transverse and longitudinal elastic modulus respectively at 9% volume fraction.

Keywords: Carbon nanotube, Interface material, Polymer composite, Shear modulus, Elastic modulus.

INTRODUCTION

A plastic polymer matrix (PMC) is a composite material consisting of a variety of shorter or continuous fibers. PMCs are designed to pass loads through matrix fibers. A lightweight, high stiffness and a high strength along their reinforcement are some of PMC 's advantages. Meanwhile, nanocomposite is a solid in multiphases where each of these stages has one, two or three dimensions of less than 100 nanometers (nm) or nanoscale structures with repeated distances between the various stages of which the material consists. The concept behind Nanocomposite is to utilize nanometer dimensional building blocks to design, construct and develop new materials with an unprecedented degree of versatility and physical efficiency. In the meantime, an interface material is any material placed between two components to improve their thermal contact. A common use is thermal dispersion where a TIM is placed between a heat generator (e.g. an integrated circuit) and a thermal dissipator (e.g. a heat sink).

Hassanzadeh-Aghdam et al. (2014) conducted a comprehensive research utilizing two combined analysis micro-mechanical approaches into the elastics behavior of carbon nanotube strengthened polymer nanocomposites and found that two fundamental factors concerning carbon nanocomposite /

polymer nanocomposites behaviour are mainly responsible, including the carbon nanotube waviness and a non-boned contact between the carbon nanotube and the underlying polymer interface. Ghassabi et al. (2019) examined the vibroacoustic performance of carbon nanotubes (CNT) enhanced composite doubly curved, thick shells with three-dimensional theory and identified that in the case of doubly curved structures, the CNTs boost the sound insulation quality. Meanwhile, free and forced vibrations, resonance and pulse anomalies were investigated in sandwich panels in the first order of shear deformation, with isotropic core and composite supported by wavy carbon nanotubes face sheets by Moradi-Dastjerdi and Momeni-Khabisi (2018). They found that increasing of CNT wavelength reduces the frequency parameter significantly as well as increases amplitudes of vibration and rising of CNT volume increases the normalized frequency as well as reduces the vibratory amplitudes. Moreover, the overall behavior of random directed wavy carbon nanotube (CNT)-reinforced polymer nanocomposites under uniaxial and biaxial loads was proposed as an elastoplastic constituent model by Hasanzadeh et al. (2019). They identified that increasing the fraction of CNT volume, the utilization of straight CNTs, reducing CNT diameters and growing interphase spacing boost nanocomposite strengthening. Jalal et al. (2019) explored the principle of big data in composite materials for a design based on "functionally graded carbon nanotube reinforced composites" through "mesh-free" and "optimized neural network" approach and it was noticed that ONN could be thousands of times faster than mesh-free methods in order to process the big data in composite structures while maintaining the simulation error at 1 percent. In addition, Pan et al. (2016) analyzed the effects on the effectiveness of the elastic modulus of curved carbon nanopath composites of wavelength as well as agglomeration and they discovered that the stiffening of composites are influenced by any of these factors. Furthermore, the dynamics of carbon nanotube (CNT)-inforced cylindrical piezocomposite shells influenced by nanotube agglomeration were first studied through the development of an empirical approach that combines theory and models by Bisheh et al. (2020). They identified that nanotube agglomeration can reduce the velocity of the wave process by reducing effective elastic properties.

The article aims to examine the effect and the mechanical characteristics of the waviness of carbon nanotubes. In this article, single-wall carbon nanotubes were produced in the form of a finite element model with the shear and elastic modulus determined with the adjustment of the wave-and-diameter of the carbon nanotube. In addition, the carbon nanotube has been considered a framework-like structure.

METHODOLOGY

The research work has been performed for aligned carbon nanotubes for evaluating the impact of carbon nanotubes in the composite. Moreover, in order to measure the mean value of the strain, the displacement value has been obtained from the horizontal sections of CNT. Atomic structure of carbon nanotube has been illustrated in the Figure 1.

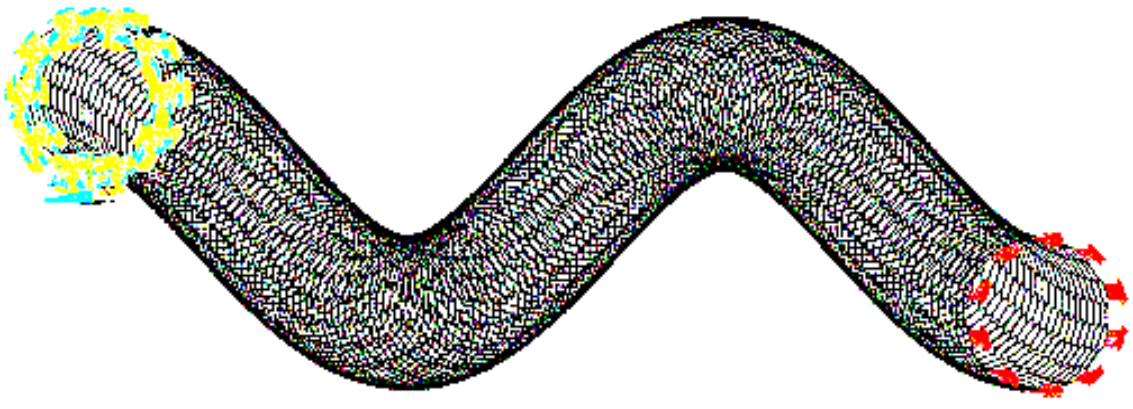

Figure 1. Atomic structure of carbon nanotube

RESULTS AND DISCUSSION

Figure 2 represnts the impact of transverse shear modulus with waviness ratio at a fixed wavelength of 23.05 and volume fraction of 2.4% was considered. From the figure, it has been noticed that the transverse shear modulus reduces with the increment of waviness ratio and maximum 12.25% decrement has been recorded.

Figure 3 represnts the impact of longitudinal shear modulus with waviness ratio at a fixed wavelength of 23.05 and volume fraction of 2.4% was considered. From the figure, it has been discovered that the longitudinal shear modulus reduces with the increment of waviness ratio and maximum 8.1% decrement has been recorded.

Figure 4 represnts the impact of transverse elastic modulus with waviness ratio at a fixed wavelength of 23.05 and volume fraction of 2.4% was considered. From the figure, it has been found that the transverse elastic modulus reduces with the increment of waviness ratio and maximum 14.4% decrement has been recorded.

Figure 5 represnts the impact of longitudinal elastic modulus with waviness ratio at a fixed wavelength of 23.05 and volume fraction of 2.4% was considered. From the figure, it has been identified that the longitudinal elastic modulus reduces with the increment of waviness ratio and maximum 64.2% decrement has been recorded.

Figure 6 represnts the impact of transverse shear modulus with volume fraction at a fixed wavelength of 23.05. From the figure, it has been noticed that the transverse shear modulus increases with the increment of volume fraction. Though the increment is not linear initially, it rises almost linearly after reaching the volume fraction of 0.025. It has been found that transverse shear modulus increases up to 1.49 times in comparison to the pure matrix of polymer at 9% volume fraction.

Figure 7 represnts the impact of longitudinal shear modulus with volume fraction at a fixed wavelength of 23.05. From the figure, it has been noticed that the longitudinal shear modulus increases initially up to the volume fraction 0.035, then decreases a little bit and after reaching the volume fraction of 0.055, it starts increasing. It has been discovered that longitudinal shear modulus increases up to 2.11 times in comparison to the pure matrix of polymer at 9% volume fraction.

Figure 8 represnts the impact of transverse elastic modulus with volume fraction at a fixed wavelength of 23.05. From the figure, it has been found that the transverse elastic modulus increases with the increment of volume fraction. The increment is not linear initially, but it rises almost linearly after reaching the volume fraction of 0.025. Maximum 1.64 times increment from the pure matrix of polymer has been noticed for transverse elastic modulus at 9% volume fraction.

Figure 9 represnts the impact of longitudinal elastic modulus with volume fraction at a fixed wavelength of 23.05. From the figure, it has been identified that the longitudinal elastic fluctuates with the increment of volume fraction. Maximum 11.63 times increment from the pure matrix of polymer has been observed for longitudinal elastic modulus at 9% volume fraction.

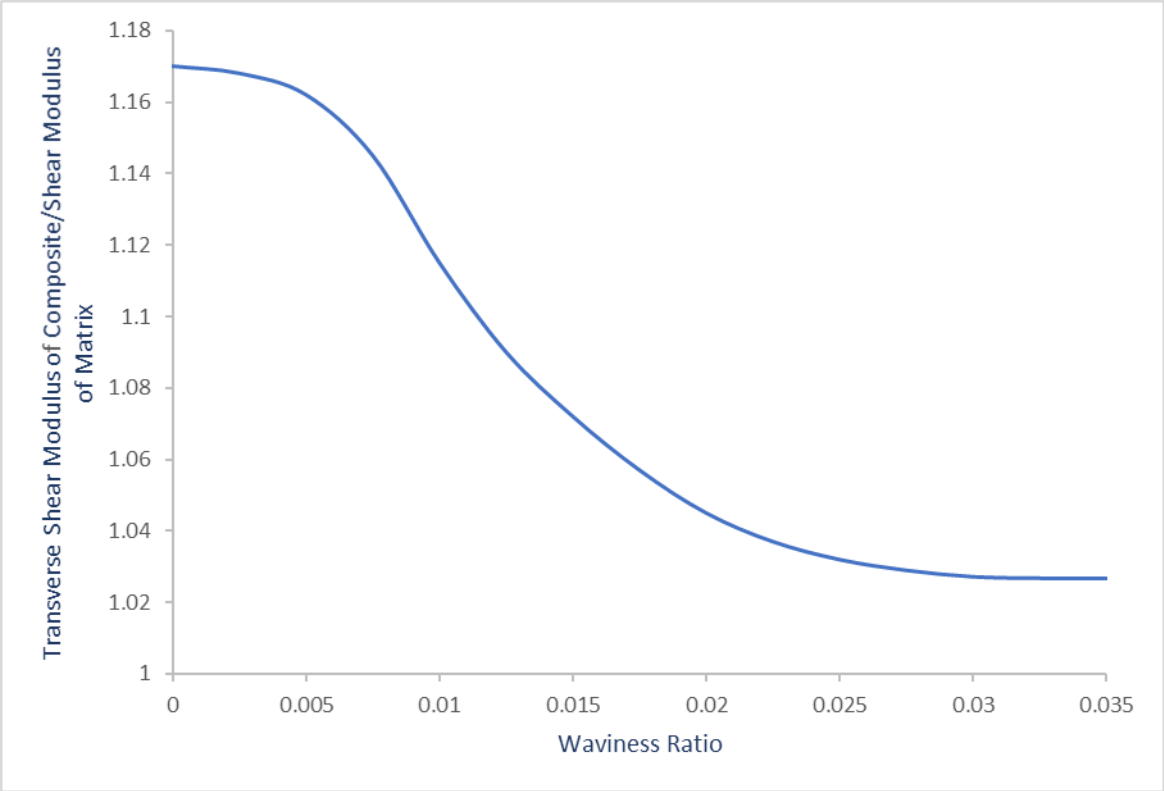

Figure 2. Impact of transverse shear modulus with waviness ratio

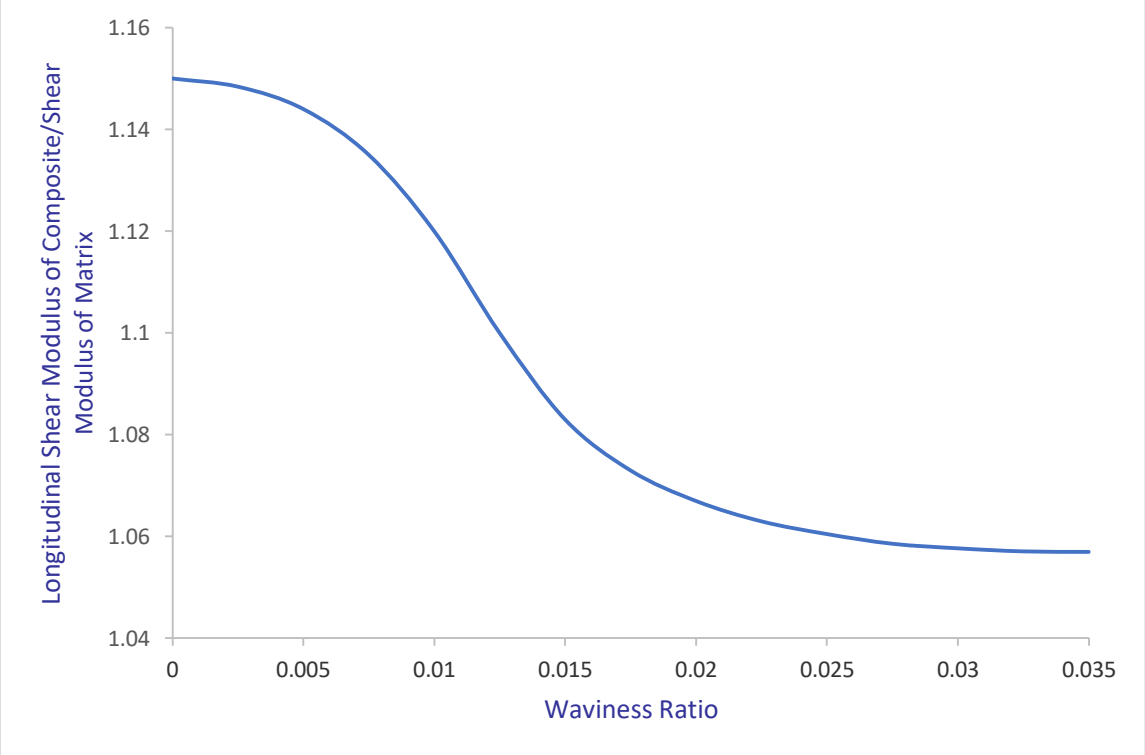

Figure 3. Impact of longitudinal shear modulus with waviness ratio

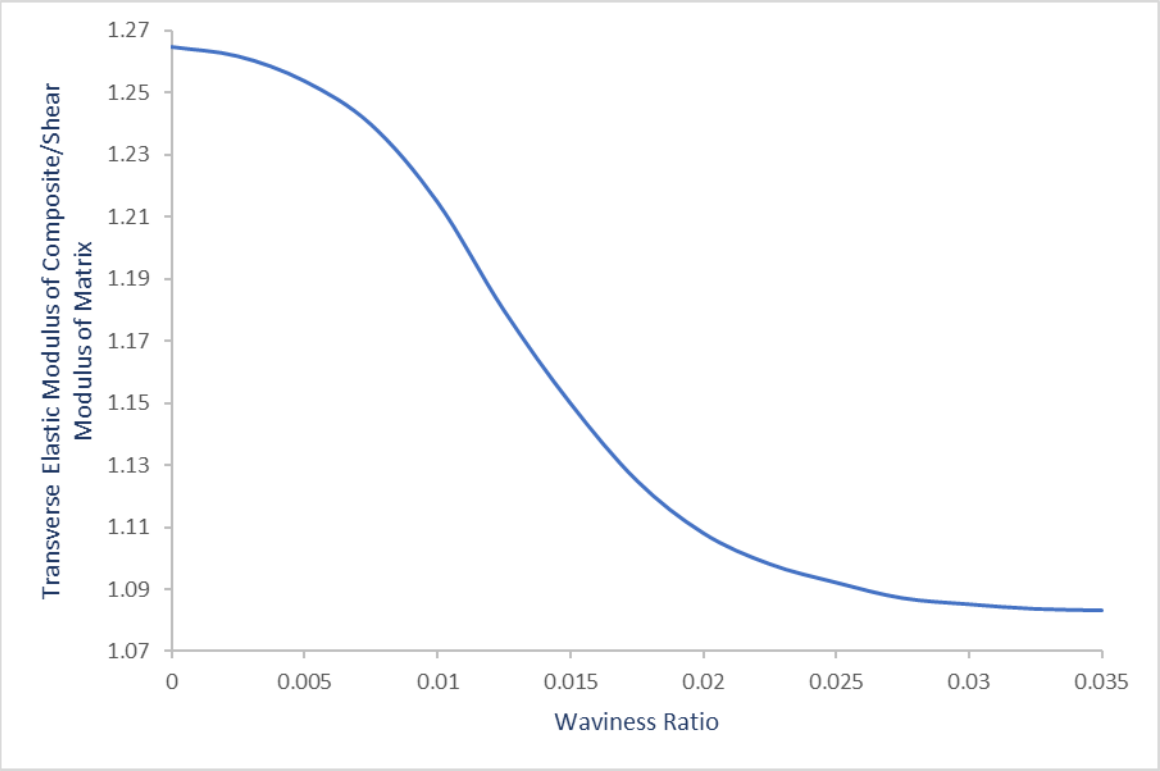

Figure 4. Impact of transverse elastic modulus with waviness ratio

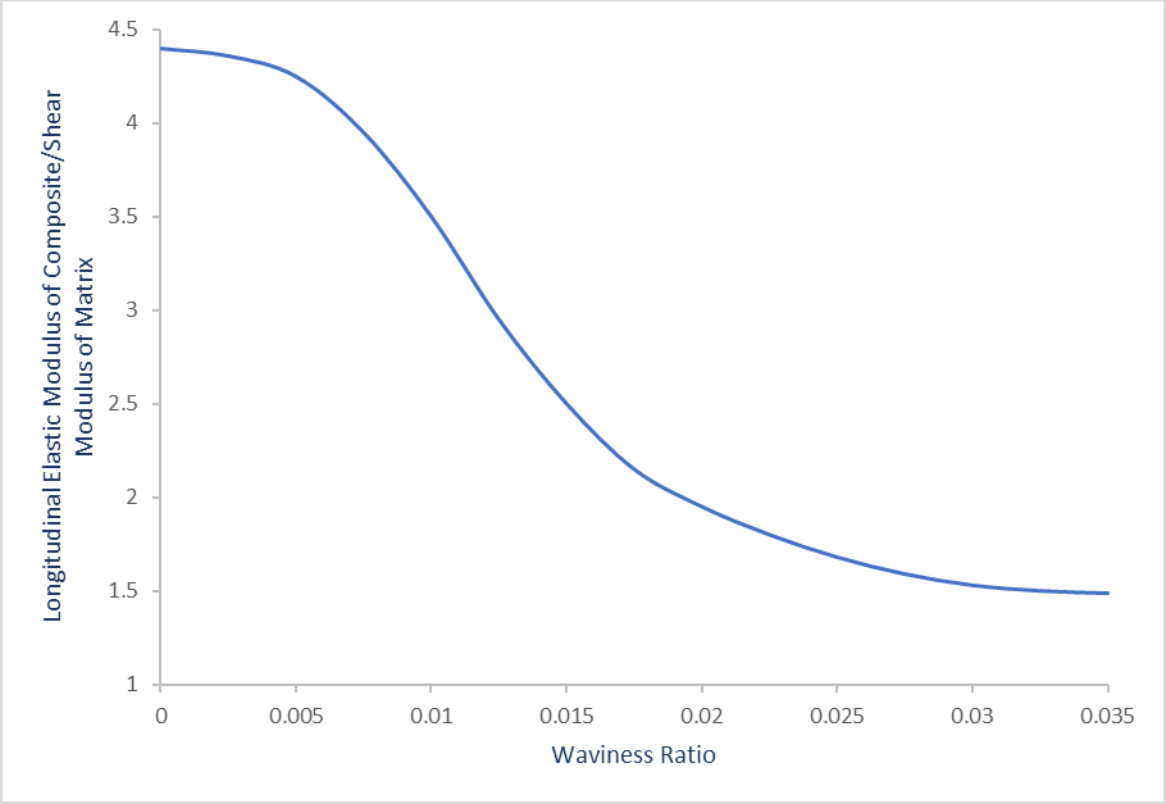

Figure 5. Impact of longitudinal elastic modulus with waviness ratio

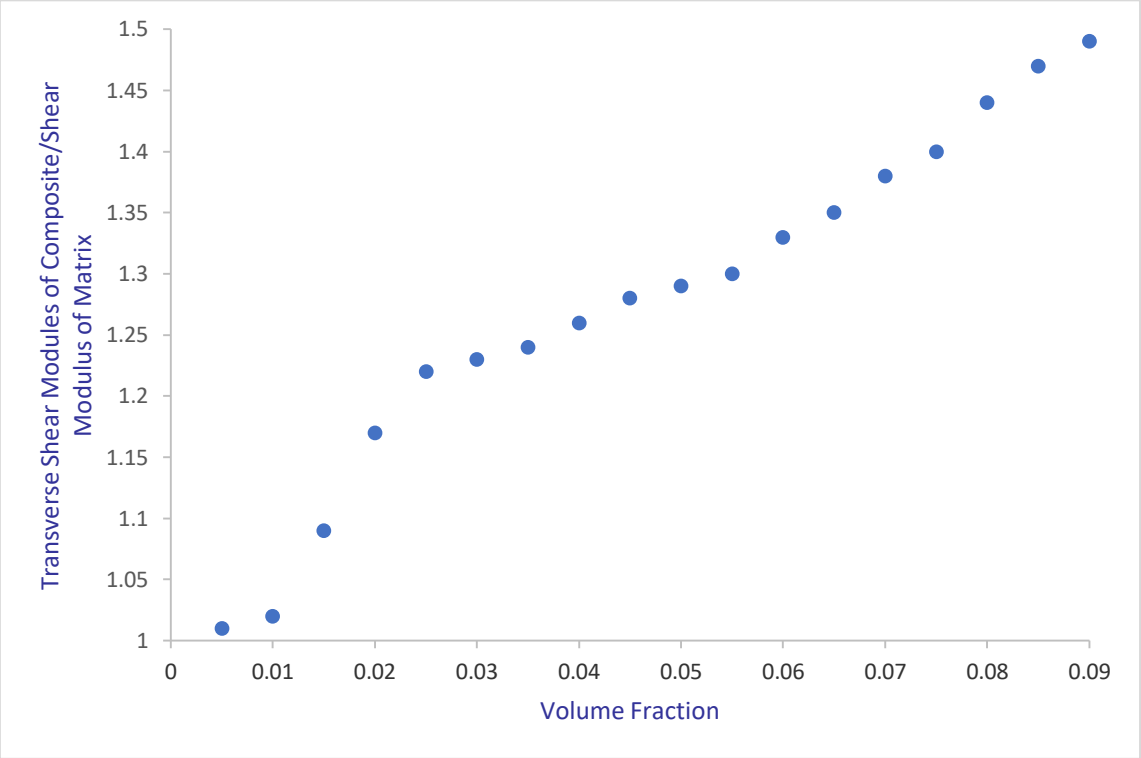

Figure 6. Impact of transverse shear modulus with volume fraction

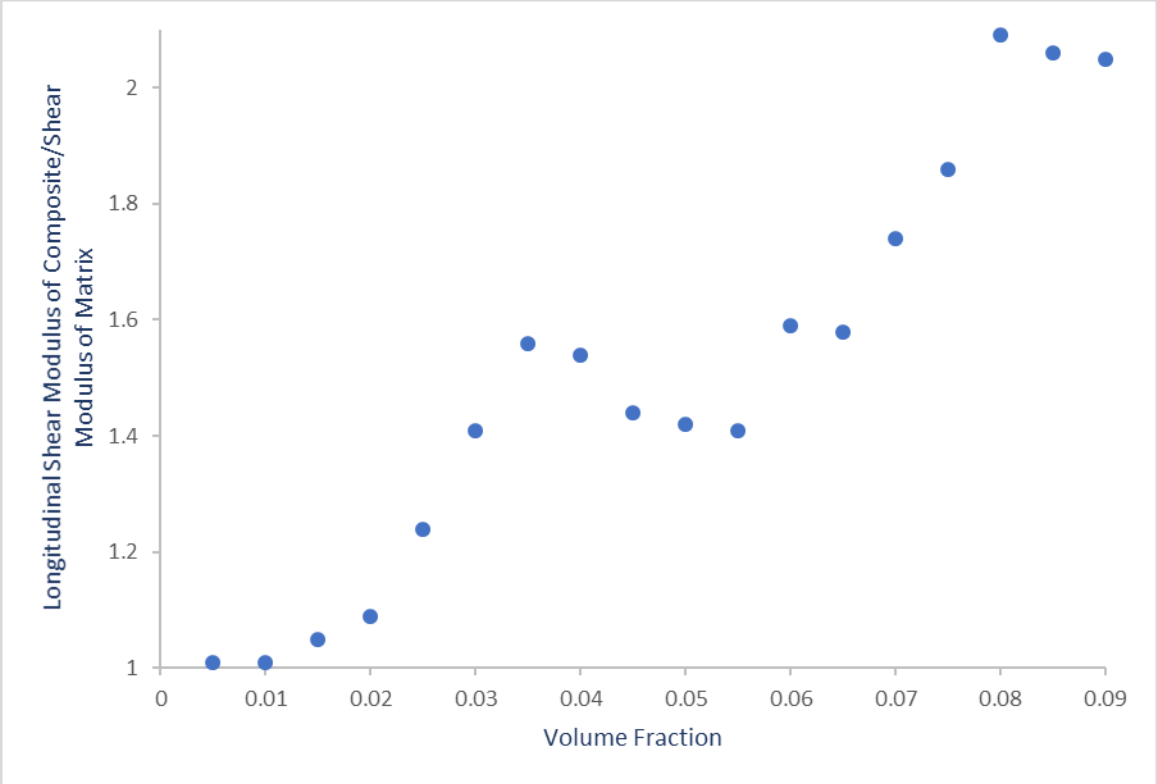

Figure 7. Impact of longitudinal shear modulus with volume fraction

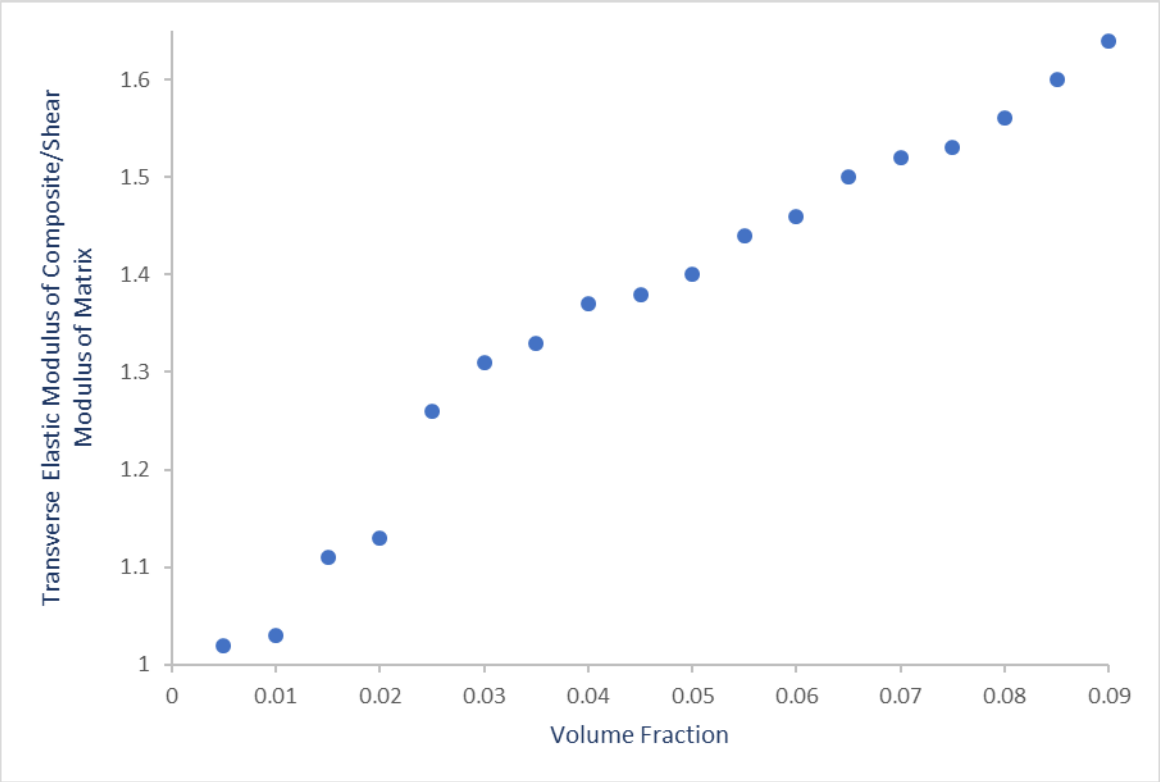

Figure 8. Impact of transverse elastic modulus with volume fraction

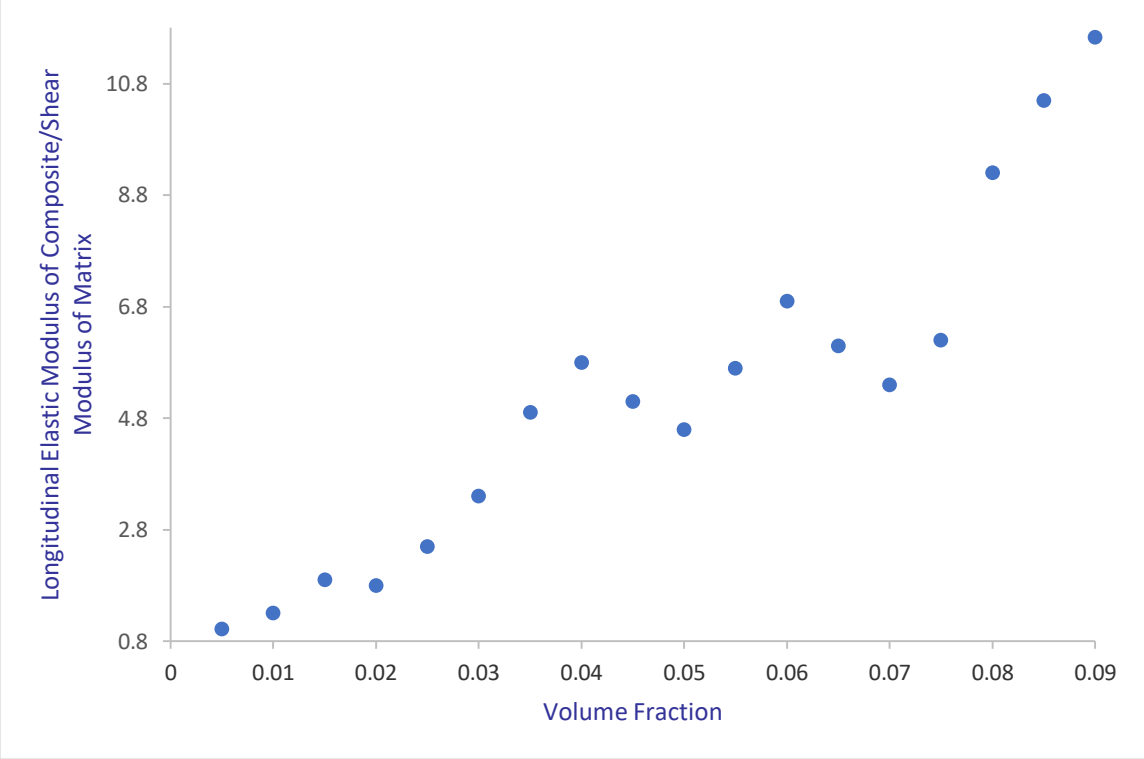

Figure 9. Impact of longitudinal shear modulus with volume fraction

CONCLUSION

The research work has been performed for aligned carbon nanotubes for evaluating the impact of carbon nanotubes in the composite. It has been found that the shear modulus and the elastic modulus of composite tend to decrease with the increment of waviness ratio. Meanwhile, transverse and longitudinal shear modulus decrease up to 12.25% and 8.1% respectively with the presence of interface material. Moreover, maximum 14.4% and 64.2% decrement of transverse and longitudinal elastic modulus respectively have been identified whenever the interface material is present. On the other hand, a tendency of increment of the shear modulus and the elastic modulus has been noticed with the increment of volume fraction of carbon nanotubes. It has been noticed that transverse and longitudinal shear modulus increase up to 1.49 times and 2.11 times respectively in comparison to the pure matrix of polymer at 9% volume fraction. In addition, maximum 1.64 times and 11.63 times increment from the pure matrix of polymer have been noticed for transverse and longitudinal elastic modulus respectively at 9% volume fraction.

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INDUSTRIAL POLICIES IN NEO-LIBERAL ERA: A COMPARISON AMONG TURKEY, USA, AND INDIA

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Abstract

The economic crisis that started in 2008 brought a painful learning process in terms of policy makers. Up until now, the largely accepted growth models have begun to be questioned. It is possible to argue that the 2008-2009 global crisis has a role in the enlightenment, especially in the developed countries manufacturing industry, in terms of sustainable growth, job creation and technological progress. The industrial policy, which started to fall in the second half of the 1980s, became a focus of policy makers after the global crisis, while manufacturing industry gained importance. All three strategic documents addressed in this paper are precious studies designed in line with global economic conditions and national targets, and which can lead the transformation of countries in the manufacturing industry. America in the coming period to maintain its position in the manufacturing industry, while in strengthening anxiety, Turkey and India's industrial policies (especially in the last 6 years programs commenced in), in this new era as the documents were written order them to gain better place in the global manufacturing market emerges. However, the application of strategy documents such as industrial policy is at least as important as the design of these documents. Because the difficulties in implementing the "Make in India" program and the inadequacy of political will make it difficult to imagine such plans. It is possible to argue that the most critical point about implementation is the authority, skill and determination of the institution that owns the plan.

In this paper, we will compare industrial policies between Turkey, USA and India in the Neo-Liberal Era.

Keywords: India, Turkey, Political Economy, USA, Industrial Policy

Basic Parameters and Its Interpretations

Price of national income and its share in total employment in the manufacturing industry is little less in USA and India than in Turkey; but when viewed on high-tech exports, and overall value, both in terms of share of exports from India and the United States turns out to be a much better place than Turkey.[1] The importance of export quality products, these two countries have grasped better than Turkey. In 2012, the national income of Turkey is about one-fifth that of employment nearly a third, representing one in producing advanced technology of Turkey's

[1] The Data presented taking by **World Development Indicators** (http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators) (last access: 16.08.2020)

manufacturing industry world that are lagging behind this degree, brings existential certain questions relating to this industrially.

Recent developments in the manufacturing industry indicate that we have begun to live in a new era: The dizzying technological progress in recent years has contributed to the improvement of transport services, in addition to the progress in new products and production processes. This new era, in which companies and people can reach each other much more quickly and easily, has brought the globalization of the value chain of production.

In addition, the trend of "returning home" also attracts attention when foreign investors move to developing countries in the last 20 years. Bilateral and regional free trade agreements give the manufacturing industry a new dimension in global competition. The transformation of the manufacturing industry brings with it different approaches to industrial policy: in addition to the traditional policy of product market interventions (production support, public ownership, tariff protection) and R & D and investment incentives, facilitation of access to finance, we are seeing measures such as strengthening the link between the establishment and operation of the production ecosystem (between firms, private sector, universities and public institutions), creating and improving the institutions that will help the development of the production ecosystem (Ken, 2013).

It is possible to argue that in the US, which is still the world's number one manufacturer, the post-crisis manufacturing industry has increased its place on the agenda. The report, A National Strategic Plan for Advanced Manufacturing, presented by US President Barack Obama in 2012, was prepared by the Science and Technology Council - Science and Technology Council, which advises the President on science and technology. In this note, the basic motivation of this document is to draw a road map to the American manufacturing sector - especially to the way the SMEs do business - to re-shape. The United States, which maintains its leadership in added value in the global manufacturing industry, has recently been worried about losing its competitive power in the manufacturing industries of countries such as Japan, Korea, Germany and China (James, Jeff, & Richard, 2012). A report published by the Information Technology and Innovation Foundation in 2012 has placed America at the top of the list of the 44 most advanced countries in the world since 2000, without developing innovation-based competitiveness (Atkinson & Scott, 2009). In Germany, Korea and Japan, the share of R & D-intensive manufacturing sectors in total manufacturing industry is higher than in the United States. While the share of total exports in high-tech products in 2000 was 34 percent, this figure declined to 18 percent in 2011 (Atkinson & Scott, 2009). The US has also shaped its industrial strategy around the "advanced manufacturing - advanced manufacturing" industry, taking into account its current position.

In India, which has been among the most important exporters of the services sector for many years, we see that some measures are being taken to strengthen the manufacturing industry. In addition to the unfavourable conditions of the global economy, the tendency of domestic consumption to decline has put considerable pressure on India's growth performance (Haruhiko, 2013). One of the proposals put forward to revitalize the slowing economy of the country and restore growth momentum is to strengthen the manufacturing industry which has been neglected until the last turn. India aims to increase its share of 14 percent in 2012 to 25 percent by 2025. *The Manufacturing Plan: Beyond the 12th Five-Year Plan and Strategies to Accelerate Growth of Manufacturing Industries in India*, the report on the industry's upcoming transformation strategy putting. This strategy document, prepared by a planning commission established under the 12th Development Plan, the country similar to Turkey. It is planned that the country's industrial policy will be shaped on three key elements: i) the development of the manufacturing and manufacturing capacity of the manufacturing industry, ii) the improvement

of the performance of the selected sectors, and iii) the improvement of the functioning of the institutions (NITI Aayog, n.d.). This strategy report, in which the conversion rhetoric felt weaker than the other two countries, noted that the proposed policies had the aim of providing paradigm shifts in the manufacturing industry of the country.

The emphasis on transformation of the industry in the Tenth Development Plan in Turkey felt quite clearly. Of course, this will be spent in Turkey's manufacturing industry will be the first conversion. Since the 1990s, the fact that low-tech products leave a considerable part of the share of exports to medium-tech products is a major achievement in Turkey economic history. Other changes in the economic conjuncture, such as this transformation and regional trade agreements, obliged the industrial policy to evolve since the planned period. Prior to 1980, the import-substitution industrialization strategy left an approach that left its place to less and less selective, horizontal areas and the nature of company operations. Since the 2000s, Turkey's industrial policy, support for SMEs, elimination of regional disparities, it is observed that given to the issue of creating a favourable environment for international capital. While the share of medium-technology products in exports increases, the share of exports of products requiring advanced technology decreases and the need for structural transformation in the manufacturing industry is clearly confronted. Another source of this worrying table, low R & D spending and the quality of human resource bottlenecks, stood out as others among the factors highlighted in the development plan to demonstrate the necessity of transformation of the manufacturing industry (Tureli, 2018).

While we look at basic research documents prepared in each of the three countries[2]-[3]-[4], the prospect of a qualified human resource, one of the most important inputs of a high-tech manufacturing industry, has been emphasized in all three strategy documents, but some qualitative differences are puzzling. As in the United States and Turkey plotted vision for the coming period in India, being the mainstay of the manufacturing industry's way of removing the unskilled labour. The belief that all manufacturing companies need low-cost labour, raw materials and easy access and convenient working environment is not an opinion that represents the present and the future of the manufacturing industry (Manyika & George, 2013).

A flexible and self-regulating education system that responds to the needs of companies is crucial for these three countries. Manufacturing Industry in Transformation SCR will serve this purpose were given plenty of space policy: the most powerful indicator of the discredited one of the vocational high tendency of industrialization in Turkey, highlighted in the report as a serious threat. However, it is worrying that the Development Plan has no reference to labor and skills in the transformation part of the industry. Although the qualified human resource is one of the four major development axes of the Plan, it is not important that there is no emphasis on the specific needs of the manufacturing industry. Turkey and India in particular reports that identify and draw attention to labor market regulation proposals. The point that the USA report differentiates in this respect is that the labor needs of the manufacturing industry are handled within a time frame: Today's employees, the individuals preparing to enter the workforce, and the policies to be implemented for the next generation are addressed separately. It is possible to argue that this approach makes the report more realistic and practical.

[2] For USA; **The Brookings-Rockegeller Project on State and Metropolitan Innovation**
[3] For India: **The Manufacturing Plan; Strategies for Accelerating Growth of Manufacturing in India in the 12th Five Year Plan and Beyond**
[4] For Turkey: https://www.resmigazete.gov.tr/eskiler/2013/07/20130706M1-1-1.doc (last access: 15.08.2020)

When we look at sector specific policy measures, different emphasis is placed on the three strategy documents. India's strategy document included recommendations for 18 sectors. However, the sector group is a bit different: the sectors covered by the letter, i) those with strategic importance; ii) sectors that provide basic input, iii) sectors that provide added value and depth, and iv) employment creators. In the strategic targets of the sectors, the presence of these groupings is felt, and when assessed from this standpoint, it is possible to argue that the strategic document prepared by India is more "selective" than the others in the sector. However, this document is observed where more emphasis is placed on horizontal area than background as similar as Turkey. In the USA's strategy document, the sectoral approach seems to have chosen to focus on four areas covering the entire manufacturing process of the advanced manufacturing industry: i) advanced manufacturing products, ii) product technology platforms, iii) advanced manufacturing processes, iv) data and design infrastructure (Manyika & George, 2013).

Conclusion

All three strategic documents addressed in this term paper are precious studies designed in line with global economic conditions and national targets, and which can lead the transformation of countries in the manufacturing industry. America in the coming period to maintain its position in the manufacturing industry, while in strengthening anxiety, Turkey and India's industrial policies (especially in the last 4 years programs commenced in), in this new era as the documents were written order them to gain better place in the global manufacturing market emerges. However, the application of strategy documents such as industrial policy is at least as important as the design of these documents. Because the difficulties in implementing the "Make in India" program and the inadequacy of political will make it difficult to imagine such plans. It is possible to argue that the most critical point about implementation is the authority, skill and determination of the institution that owns the plan.

The US plan presented by former President Obama seems to have been personally owned by the top policy maker in the country in this respect. Even if Trump tries to change this program on its own, federal agencies that are responsible for ensuring the implementation of the proposed policies in each department are the main focus of this program, once the route map to the five targets on the basis of the document has been identified. India's industrial policy seems to have been owned by the Indian Planning Commission, the Ministry of Industry Policy and Promotion and the Competition Board of the Manufacturing-related Manufacturing. Perhaps, in India, which has a long tradition of democracy, the complex bureaucratic structure that slows down decision-making and implementation slows down the concern that it may jeopardize the applicability of the industrial policy document, and has provided the authorities with their mandates and mandates to implement the plan, along with the proposed policies, in detail. In Turkey, the lack of coordination between institutions and relevant bodies often not enough understanding of the multidimensional strategy documents, such as industrial policy, brings with it the danger of incomplete ambitious targets. the increasing political tension in the last decade has resulted in the start of the work of these policies to regress and regulate all policies.

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Online Resources

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- https://www.chinadaily.com.cn/kindle/2013-02/21/content_16242238.htm
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CONCOMITANT LYMPHOMA AND TUBERCULOSIS IN A PARROT

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Abstract

Neoplasia is an important problem that should not be overlooked in avian species. In addition to tumors, diseases such as tuberculosis may develop when the immune system is suppressed. In this case, lymphoma and productive lung tuberculosis were observed simultaneously in 10 years old, male, grey parrot. After necropsy was performed, specimens were fixed in 10% neutral buffered formalin. Tissues were processed routinely and stained with hematoxylin-eosin and Ziehl-Neelsen Staining for acid-fast bacilli detection. Microscopically, atypical neoplastic lymphoid cells were seen in spleen and liver and a granulomatous tubercle was detected in the lung. Concomitant tuberculosis and lymphoma is a rare occurrence in parrots that may be due to the immunosuppression of the animal.

Keywords: avian, lymphoma, pathomorphology, tuberculosis

INTRODUCTION

A wide variety of neoplastic diseases are seen in avian species. Especially pet birds like parrots suffer from neoplastic diseases. Lymphoma is one of the most common neoplasms in psittacines and passerines (Leach, 1992; Coleman, 1995; Schmidt and Quesenberry, 1997). On the other hand, when considering lymphoma in all poultry, it should not be forgotten that many types of lymphoma occur as a result of viral infections like Marek's disease and Avian leukosis (Shivaprasad, 2017).

Tuberculosis is a common disease in poultry as well as in mammals. While several mycobacterial species can cause avian tuberculosis, the most common agent is *Mycobacterium avium*. It causes tubercle fomations in organs such as intestine, liver, spleen. Microscopically, lesions of avian tuberculosis consist of a central necrotic area surrounded by epithelial cells, lymphocytes, multinucleated giant cells and a fibrous capsule. Calcification of the necrosis is rarely seen in avian species. Acid-resistant bacilli are abundant in the central or necrotic area of the tubercle (Fulton and Thoen, 2003; Dhama et al, 2007).

The aim of the study was to examine pathomorphologically this case, in which two important diseases such as lymphoma and tuberculosis were seen at the same time.

MATERIALS AND METHODS

The material of the case was 10 years old, male, grey parrot. It was brought to Ankara Univesity, Faculty of Veterinary Medicine, Department of Pathology for necropsy. After necropsy was performed, specimens were fixed in 10% neutral buffered formalin, processed routinely and embedded in paraffin. Sections (4-5 µm) were stained with haematoxylin and eosin (HE) and examined under light microscope. Also, Ziehl-Neelsen Staining was done for specimens from lung.

RESULTS

Macroscopically, it was noticed that the liver was enlarged and took up quite a lot of space in the body cavity (Figure 1). There were yellowish mottling on the surface of the liver and its edges were blunt. Also, the spleen was enlarged and reached 2 cm diameter. The right lobe of the lung was slightly dirty yellowish in color.

Figure1. Enlargement and yellowish mottling (arrow) on the surface of the liver.

Microscopically, atypical neoplastic lymphoid cells, mostly composed of lymphoblasts, were seen among dissociated cords (Figure 2.a). Degenerative-necrotic changes were observed in most hepatocytes. The same neoplastic cells were also found in the spleen (Figure 2. b). In some areas, it was observed that follicle structures disappeared due to neoplastic cells. In the lung, a tubercle structure formed was seen (Figure 2. c). Neutrophil leukocytes, histiocytes, epithelioid cells, macrophages, lymphocytes and foreign body giant cells was found around the necrosis that located at the center of the tubercle (Figure 2. d). Acid-resistant bacilli were detected with Ziehl-Neelsen Staining.

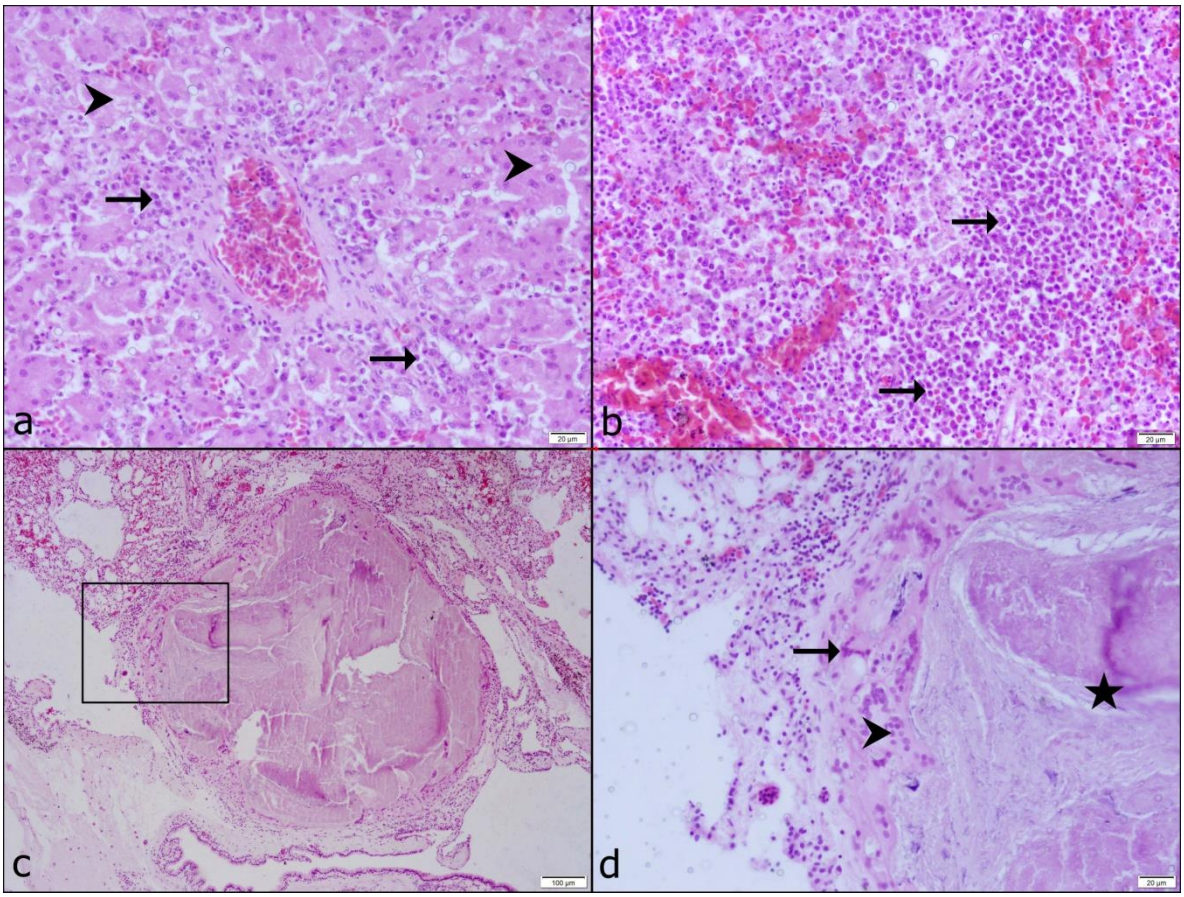

Figure2. a. Atypical lymphoid cells (arrows) between cords and degenerative hepatocytes (arrowheads), liver, HE., **b.** Atypical lymphoid cells (arrows), spleen, HE., **c.** Histological appearance of the tubercle formation, lung, HE., **d.** Closer image of the square in c, necrosis (star), foreign body giant cell (arrow), macrophages and epiteloid cells (arrowhead), lung, HE.

DISCUSSION

In this case, lymphoma, which is reported to be very common in pet birds, was encountered in accordance with the literature (Leach, 1992; Coleman, 1995; Schmidt and Quesenberry, 1997). Enlargement of the organs like liver and spleen is also one of the pathomorphological lesion we expect to be seen in lymphoma cases (Coleman, 1995; Reavill, 2001). So, pathomorphological changes observed in the case were also compatible with the literatures. With this case, considering that lymphoma was seen in a 10-year-old parrot, it was emphasized that the incidence of neoplasia increases with age.

Another finding that we encountered in the same patient incidentally was tuberculosis. It has been reported that tubercle formation in poultry is seen mostly in intestine, liver, spleen, ovaries, testes, and bone marrow. In lungs it is only seen occasionally as in case of tuberculosis of pigions and water fowl (Fulton and Thoen, 2003; Dvorska et al., 2007). In contrast, in this case the tubercle structure was seen in a lung of a parrot. Histologically, in this case, unlike mammalian tuberculosis, the observation of necrosis without calcification and the observation of a foreign body giant cell were consistent with the literature (Fulton and Thoen, 2003; Dhama et al, 2007, Mayahi, 2013).

CONCLUSION

Concomitant lymphoma and tuberculosis has not been reported in a parrot before. We can actually attribute this to the fact that postmortem examination of pet birds such as parrots is not demanded by

the owners. Neoplasms generally suppress the immune system, and the possibility of tuberculosis increases when the immune system is suppressed.

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IN VITRO MORPHOGENETIC RESPONSES IN LEAF DISC EXPLANTS OF SUGARCANE (*Saccharum Officinarum L.*) COS 96268

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Abstract

Robust direct regeneration protocols are essential for the development of efficient genetic transformation systems. The regeneration potential in leaf explants vis-à-vis 2 nd direct and indirect organogenesis under hormonal influence was investigated. Different levels of Auxin (2, 4-D = 0-5mg/l) and Cytokinin (Kinetin = 0-1 mg/l) alone and in combination with each other were tested. The young leaf tissues were found to develop root (hormone free medium), callus, shoot (1 mg/l 2, 4-D + 0.5 mg/l Kin) and both root and shoot (3 mg/l 2, 4-D + 0.5 mg/l Kin), the callus so produced also regenerated shoots (0.2 mg/l BAP+0.1 mg/l NAA), which could be further multiplied (0.8 mg/l BAP+0.1 mg/l NAA mg/l) and readily rooted on half strength basal MS medium. The study concluded that CoS 96268 is a responsive genotype vis-à-vis direct organogenesis and leaf tissues of the cultivar could be taken up for optimization of direct regeneration and development of transformation systems.

Key words: Sugarcane, Leaf tissue, Dedifferentiation, Direct regeneration

Introduction

Sugarcane (*Saccharum spp.* hybrids) is a crop with high economic significance as it accounts for more than 80% of the world's sugar production. Past few years research have been focused on an alternative biofuel source to conventional petroleum fuels that lead to global warming. It is conventionally propagated through stem cuttings (called 'setts'). Crop improvement *via* biotechnological tools like genetic engineering and plant tissue culture has given a new dimension of research. Plant tissue culture technology is being broadly applied for commercial plant multiplication. It is a rapid method to multiply thousands of plants in short time. Leaves are good target tissues (i.e explants) for *in vitro* mass propagation and genetic transformation of sugarcane as is evident from previous studies (Snyman *et al.*, 2006; Kalunke *et al*., 2009; Pandey *et al*., 2012; Rani *et al*., 2012; Wang *et al*., 2017). The regeneration from leaf tissues is generally preceded by a callus phase. This is undesirable in sugarcane, which on account of high ploidy level is very unstable *in vitro*. Moreover regeneration through callus also requires longer duration in culture for callus multiplication and regeneration of plantlet, further aggravating the chances of somaclonal variation and increasing the overall costs involved. Thus, direct regeneration systems are the need of hour. But the direct regeneration in sugarcane has generally been limited to

inflorescence tissues in sugarcane (Snyman *et al.*, 2006) which are not frequently available on account of irregular flowering behaviour in time and space. Of late direct regeneration in sugarcane has been obtained from thin cell layer (Laxmanan *et al*., 2006), leaf segments (Gill *et al*., 2006) and leaf midrib segments (Franklin *et al.*, 2006). However, genotype constitution influences morphogenic responses in tissue culture systems (Gill *et al.*, 2006; Garcia *et al*., 2007), making studies on morphogenic competence of different commercial cultivars necessary.

The present study was conducted to evaluate regeneration potential in leaf explants of sugarcane CoS96268, an elite early maturing, high biomass and sugar yielding cultivar with multiple resistance to diseases; which also transformed with *Cry*1*Ac* gene for early shoot borer resistance. In a quest to develop a protocol for direct regeneration from leaf tissue of CoS 96268, the effect of various concentrations of auxin, cytokinin and their combinations was studied. Procedures described for somatic embryogenesis and organogenesis in sugarcane generally include a phase of callus induction in the dark, followed by transfer of the callus to a medium for shoot induction / germination of somatic embryo. This medium without/low amounts of 2, 4-D and that including cytokinins (Irvine *et al*., 1991) have been used for shoot regeneration from callus. In an attempt to induce dedifferentiation and shoot induction in leaf explants of sugarcane, on the same medium, different combinations of 2, 4-D and Kinetin were tried. This is the first report describing investigation of direct regeneration potential of sugarcane cultivar under the combined influence of 2, 4-D and kinetin. The direct induction of shoots and simultaneous induction of roots and shoots are also being reported for the first time in sugarcane.

Materials and methods

Explant preparation and inoculation

Field grown plants of sugarcane cultivar CoS96268 (8-10 months old) growing at experimental farm of Sugarcane Research Institute, Shahjahanpur, U.P. served as source material. Shoot tops were harvested and a 10 cm spindle of leaves attached to the shoot apex was obtained after removing the attached leaves. Outer leaf sheaths were removed and the remaining tissue was wiped with 70% ethanol and washed with 1% tween20 (Duchefa Biochemie, Netherlands). Subsequent to this the spindle was surface sterilized with 0.1% (w/v) mercuric chloride ($HgC1_2$) solution for 12 minutes under aseptic conditions. After four rinses with sterile distilled water, the cylinder (5-8 cm) containing shoot apex and 3-4 attached rolled leaves was excised. Such cylinders were sliced into approx. 5 mm thick discs or 2cm segments containing midrib region of young unopened leaves which were placed on semisolid MS medium (Murashige & Skoog, 1962) supplemented with different levels of auxin (2, 4-D = 0-5mg/l) and cytokinin (Kinetin = 0-1 mg/l) alone and in combination with each other.

Culture conditions

The pH of the medium was adjusted to 5.7 prior to all autoclaving. The cultures were incubated in 25± 2^0C and 16 h light under white florescent light with a photon flux density 30µmol $m^{-2}s^{-1}$(a relatively low light regime) for five weeks.

Results and discussion

Direct regeneration from leaf tissues is an ideal system for *Agrobacterium* mediated transformation. Direct regeneration reduces time involved in various stages of tissue culture also reducing the chance of somaclonal variation (Laxmanan *et al*., 2006; Pandey *et al*., 2012). The leaf tissue provides chances for optimal penetration and infection by *Agrobacteria*. Further, the regenerates, under this system originate from one or a few cells, reducing the chances of shoot escapes or chimeras. The regeneration potential in leaf explants of sugarcane cultivar CoS96268 vis-à-vis direct and indirect organogenesis under hormonal influence was investigated.

The young leaf tissues have been frequently used to induce callus in sugarcane (Chengalrayan & Gallo-Meagher, 2001) however there are very few reports on direct regeneration from these tissues (Snyman *et al*., 2006; Laxmanan *et al*., 2006; Franklin *et al*., 2006; Garcia *et al*., 2007; Gill *et al*., 2006; Watt *et al*., 2009) and no report of simultaneous root shoot induction in the leaf tissues of sugarcane. Different levels of auxin (2, 4-D = 0-5 mg/l) and cytokinin (Kinetin = 0-1 mg/l) alone and in combination with each other were tested. 2, 4-D and Kinetin have been frequently used to elicit *in vitro* morphogenic responses in sugarcane (Chengalrayan & Gallo-Meagher, 2001) rather than 2, 4-D and Kinetin together.

In the present study, young leaf tissues of sugarcane cultivar CoS 96268 were found to develop roots (fig1.g&h), callus (fig1.a), shoots (fig1.d&e), and simultaneously both root and shoots (fig1.j). Callus and shoot cultures from directly regenerated shoots, could be multiplied further (fig.1.b&f) on callus multiplication medium and shoot multiplication medium respectively. Callus cultures produced normal shoots (fig1.c) on regeneration medium, while shoot cultures rooted normally on rooting medium (fig1.i). The hormonal concentrations and the medium that generated these morphogenetic responses in leaf explants of CoS 96268 are summarized in table (1).

The young leaf tissues were found to develop root on hormone free medium. This indicates the presence of endogenous hormonal balance in favor of rooting response. Rooting from leaf explants was also reported by Nand Lal (2003). The successful induction of callus from leaf tissues on MS medium supplemented with high levels of 2,4 D in the present study is in line with the reports of several authors in sugarcane (Fitch & Moore, 1990; Oropeza & Garcia, 1996; Chengalrayan & Gallo-Meagher, 2001). The multiplication of Callus on callus multiplication medium (table-1) and regeneration of shoots on shoot regeneration medium (Table-1) was successfully achieved in the present study. The results are similar to earlier reports mentioned above; however the amount of

phytohormones required for eliciting the optimal response did vary. This of course could be attributed to the genotype associated variations in tissue culture (Gill *et al.*, 2006; Garcia *et al.*, 2007).

In the present study optimum shoot induction response was obtained on MS medium supplemented with 1mg/l 2, 4-D + 0.5 mg/l Kin. These shoots could be further multiplied optimally on shoot multiplication medium (Table 1). Direct regeneration of shoots in leaf explants of sugarcane is an established phenomenon (Snyman *et al.*, 2006; Laxmanan *et al*., 2006; Franklin *et al.*, 2006; Garcia *et al.*, 2007; Gill *et al*., 2006; Watt et al., 2009), however, the regeneration potential is genotype dependent (Gill *et al.*, 2006; Garcia *et al*., 2007) and is governed by auxin cytokinin ratio (Chengalrayan & Gallo-Meagher, 2001). Direct shoot induction was observed at 1 mg/l 2, 4-D + 0.5 mg/l Kin which is different from other reports on direct regeneration of shoots from leaf explants in sugarcane (Snyman *et al*., 2006; Laxmanan *et al.*, 2006; Franklin *et al*., 2006; Garcia *et al*., 2007; Gill *et al*., 2006) who have used NAA instead of 2, 4-D. Chengalrayan *et al*. (2005) have described shoot formation from callus on medium supplemented with 2, 4-D. Our results show that both the hormones added to the medium at optimum doses could lead to direct formation of shoots on leaf explants when incubated under light. This could be attributed to the manifestation of dedifferentiation due to 2, 4-D and shoot induction due to cytokinins simultaneously. The other reports on direct regeneration in sugarcane utilized NAA instead of 2, 4-D.

Present study indicated that leaf explants have the potential for simultaneous induction of both roots and shoots, provided a suitable auxin-cytokinin balance is supplimented by the culture medium. In the present study the response was elicited when the explants were placed on MS medium supplemented with 3 mg/l 2, 4-D + 0.5 mg/l Kin) and incubated under light. Chengalrayan *et al.* (2005) described formation of embryoids in sugarcane callus cultured for two weeks on, 2, 4-D supplemented medium subsequent development both root and shoot when transferred to MS basal medium.

The shoots induced directly on leaf explants and those regenerated from callus, could be rooted readily on transfer to rooting medium (table 1) enabling the formation of complete viable plantlet ready for hardening and field plantation. Rooting of dedifferentiated shoots on hormone free MS medium is also described by Franklin *et al*. (2006).

Thus, the study concluded that CoS96268 is a responsive genotype vis-à-vis direct organogenesis and leaf tissues of the cultivar could be taken up for optimization of direct regeneration and development of transformation systems.

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Table: 1 Medium composition eliciting different responses in leaf explants of CoS96268

S.No.	Optimum regeneration response	Medium used
1	Direct induction of root	MS (hormone free)
2	Callus induction	MS + 3.0 mg/l
3	Callus multiplication	MS + 2.0 mg/l
4	Regeneration from callus	0.2 mg/l BAP+ 0.1 mg/l NAA
5	Direct shoot induction	1 mg/l 2, 4-D + 0.5 mg/l Kin
6	Shoot multiplication	0.8 mg/l BAP+0.1 mg/l NAA mg/l
7	Root induction in multiplied shoots	½ MS (hormone free)
8	Simultaneous root shoot induction	3 mg/l 2, 4-D + 0.5 mg/l Kin

Fig 1. Morphogenetic responses of leaf Explants of Sugarcane cultivar CoS96268. A. induction of callus in leaf disc explants, b callus multiplication, c. shoot regeneration from callus, d & e direct induction of shoots in leaf segment and leaf disc, f. multiplication of shoot cultures, g & h direct induction of roots in leaf segment and leaf disc, i. rooting of shoots (view of the flask base to show profuse rooting), j. simultaneous induction of root and shoot on the same medium, k. rooted plantlet of sugarcane cultivar CoS96268.

MOLECULAR STRUCTURAL ELUCIDATION AND LOCATION OF MN(II) ION IN DIAQUAZINC(DIAQUABISMALONATO)ZINCATE BY SPECTROSCOPIC STUDIES

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Abstract:

Single crystal EPR, optical, FT-IR and powder XRD studies of Mn(II) ion incorporated diaquazinc(diaquabismalonato)zincate were carried out at room temperature to get understanding about the dopant. Observed EPR spectrum result shows 30 lines hyperfine patterns, it indicates manganese present in the host lattice with large D value. The spin Hamiltonian parameter have been evaluated using three orthogonal crystal rotations: g_{xx} = 1.997, g_{yy} = 2.004, g_{zz} = 2.008 ; A_{xx} = 8.32, A_{yy} = 8.54, A_{zz} = 9.74; D_{xx} = 35.4 D_{yy} = 7.46 D_{zz} = -42.85 mT. The large zero field tensor due to steric interaction of malonato bridge. The direction cosines of spin Hamiltonian parameters (g, A and D) were propose that Mn(II) ion has entered the lattice substutionally and precise direction has been establish with help of position of atoms in host lattice. The covalency of Mn(II)ligand bonds were estimated using Matumura's plot. The observed optical band were assigned as transition from the $^6A_{1g}$(S) ground state to various excited quartet levels of Mn(II) in distorted octahedral symmetry. The theoretical band positions were examined by energy expression and its good agreement with experimental values. The crystal field (Dq) and Racah inter electronic repulsion parameters were studied as well.

Keywords: EPR Spectroscopy, Manganese, Spin Hamiltonian, Zinc malonate

1. Introduction:

Structural investigations of Cu(II) and VO(II) ion in zinc and cadmium malonato complexes were reported [1-2]. The results designated that the dopant has entered the lattice substutionally, which was a rare surveillance due to the structural constricts. In continuation of our effort to malonato complexes due to considerable important in the field of crystal engineering, supramolecular architecture, molecular electronics, catalysis, magnetic materials. In addition carboxylic acid were essential compounds for living organism and also strong coordination ability to various transition metal ions such as Cu(II), Co(II), Ni(II) etc, malonic acid was also a good chelating ligand leading to form homometallic chain compounds. Due to the fact that malonate are suitable aspirant for the examination of exchange coupling interaction between the adjacent metal, have played prominent role for many biological system [3-5]. For examples, zinc malonate used as dental relevances, platinum malonato complexes have employed as treatment of malignant tumor. Malonic acid is well known competitive inhibitor of symbiotic nitrogen metabolism occurs in large amount in the living systems naturally, especially in

rat's brain. The malonate ligand is a dicarboxylic acid group with single behavior different from the other dicarboxylic ligands. It can exhibits different coordination modes such as (i) bidentate [η^5-chelation], (ii) bidentate [η^5-chelation] + unidentate and bidentate [η^5-chelation] + bis(unidentate). From coordination point of views, malonic acid have two neighboring carboxylic acid groups is very flexible to form complexes with transition metals. This chelating ligand can act as bridging as well blocking ligand to generate metal organic frame works of different dimensionalities may lead to interesting architecture. Thus, combining the malonate with the other bridging or blocking ligands are also able to prepare monomers, dimers, trimers, tetramers, infinite chains, 2D and 3D arrays. Another feature of the malonato bridge is the magnitude of exchange interaction which depends on the syn-syn, syn-anti, anti-anti bridging modes also it adopts. The nature (ferro- or antiferromagnetic) of the interaction being dependent on the nature of the magnetic orbitals of the spin carriers connected by the bridging ligand. In addition, the carboxylate group provides an efficient pathway for coupling magnetic centers either ferromagnetic or antiferromagnetic [6-7]. Different topologies have been examined for the homobimetallic cobalt, nickel and manganese complexes. Most of these complexes have been magnetically characterized and they exhibit ferromagnetic coupling through carboxylate bridged [8-9]. Based on above fascinating phenomenon, we have prepared diaquazinc(diaquabismalonato)zincate and structurally characterized by single crystal XRD. Diaquazinc(diaquabismalonato)zincate (after abbreviated as DZDBZ) is chosen as good diamagnetic host lattice and introduced another paramagnetic ion in this lattice. Among the transition metal ions, we preferred manganese(II) ion was preferred, because the shell contains five unpaired electron (S =5/2) with half filled configuration and resultant angular moment is zero. The ground state of Mn(II) is $^6S_{5/2}$. EPR study of Mn(II) have been done quite expansively in the exploration of structural and dynamic aspect of crystalline state since zero field splitting in these ions were sensitive to even small distortions. The study were further widen to ascertain the location of Mn(II) present in DZDBZ and find out the spin Hamiltonian parameters, predict distortion and bonding parameters also discussed.

2. Experimental

Zinc acetate and malonic acid wee purchase and used without purification. The amount of zinc in DBDBZ was determined by Gravimetric using 8-hydroxy quinoline as well complexometric titration using EDTA. The CHN microanalyses were carried out on an elemental analyzer and the content of Mn(II) were determined by atomic absorption spectrophotometer. Optical absorption spectrum was recorded at 300K using a varian carry 5000 UV Visible near infrared spectrophotometer in the range of 200-1000 nm. The FT-IR spectra were recorded for doped and undoped materials on a Shimadzu FT-IR 8300/8700 spectrometer with 4 cm^{-1} resolution, automatic gain, and 20 scans in the frequency range of 4000-400 cm^{-1}. The measurements are made using almost transparent KBr containing fine powdered sample. Powder XRD measurements were carried out for doped and undoped materials on a PANalytical X'pert PRO diffractometer with Cu Kα radiation of wavelength 0.15406 nm and 2θ range between 5 and 10 75º. EPR spectra were recorded on a JEOL JES –TE100 ESR spectrometer 11 operating at the X-band microwave frequency, equipped with 100 kHz 12 field modulation for obtaining first derivative EPR spectrum. DPPH (2,2- diphenyl-1-picrylhydrazyl) with a g-value of

2.0036 is used for g-factor calculations. Angular variations are made by rotating the crystal along the three mutually orthogonal axes a, b, c* in 10° interval. Isofrequency plots of each plane were simulated using program EPR-NMR [15]. The EPR spectrum of powder sample was simulated using SimFonia program developed and supported by Brucker Biospin.

3. Crystal structure

DZDBZ $[Zn(H_2O)_2(Zn(mal)_2(H_2O)_2]_n$ was belongs to monoclinic with space group $P2_1/n$ having unit cell parameters a = 0.7305 (4), b= 0.7412 (4), c = 1.1075 (7) nm: β = 95.364(5)˚ and Z = 2. The central zinc atom lies in an inversion center (Fig.1a-1b). The oxygen atoms can be divided into four sets according to their bonding features, namely, terminal, bi-bridging, tri-bridging and penta-bridging oxygen atoms. All Zn–O bond distances are within the expected ranges. The dihedral angle between the rings C1-C2-C3-O1-O2-Zn and C1d-C2d-C3d-O1d-O2d-Zn is 0.02(1)°, shows that both rings are co-planar. The Zn1 center is octahedral, with O(1) and O(2) of two bidentate malonate anions at basal sites (distances of 2.046(3) and 2.048(3) Å, respectively). The O(4) atom of the malonate ligand is linked to the zinc atom Zn2 forming a network. The Zn1 and Zn2 atoms are coordinated to two O(4) and two O(5) of different malonate anions and two O(6) of the lattice water molecule, the average distance being 2.123 Å. Coordination is completed via O(4) atoms at distances of 2.137(3) Å from other malonate anion. These bridging arrangements by carboxylate groups form infinite sheets in which the closest Zn...Zn separation is 5.20 Å. All the bond angles around Zn are close to 90°. The bond angle and bond length of DZDBZ is given in Table (1a-1b) respectively. In all the hydrogen bonds, the water oxygens act as donor atoms, and the carboxylate act as acceptor atoms. The largest donor acceptor distance is 2.15(4) Å between O3 and O4. In this structure, the malonate groups have an extended conformation. The average C-O distances are 1.26 Å, and the average O-C-O angles are 122°. These values agree well with that of other previously reported malonate-containing metal complexes [10]. Two water molecules and four coordinated malonate-oxygens form a distorted octahedral surrounding around the zinc atom. The values of the Zn–O (malonate) bond distances are [2.137(3) and 2.147(3) Å,] this distances are somewhat similar to the values of the Zn–O(water) ones [2.086 Å]. The best equatorial plane around the zinc atom is defined by the O(4), O(5), O(4c), and O(5c) set of atoms, in this plane all the atoms are in planes, there is no slight deviation from the metal atom as well as from the other atoms. Each malonate group adopts bidentate and monodentate coordination modes towards zinc atoms. This ligand adopts envelope conformation, with the puckering parameters q_2 and φ and the smallest displacement asymmetric parameters, Δ_s, as follows: q_2=0.443(3) Å, φ =359.6(5) °, Δ_s (C2) = 0.5(4), in which only the methylene group is significantly displaced from the chelating six-membered chelate. The atom O3 acts as a donor to the atom O4 of the neighbor molecule. This hydrogen bond is involved in a motif C(6) forming an infinite chain along a axis and also the intra molecular O6-H6A…O2 hydrogen bond forms a S(6) ring motif. In addition to the vander wals interactions, the crystal packing is stabilized by O-H…O hydrogen bonds forming a three dimensional network.

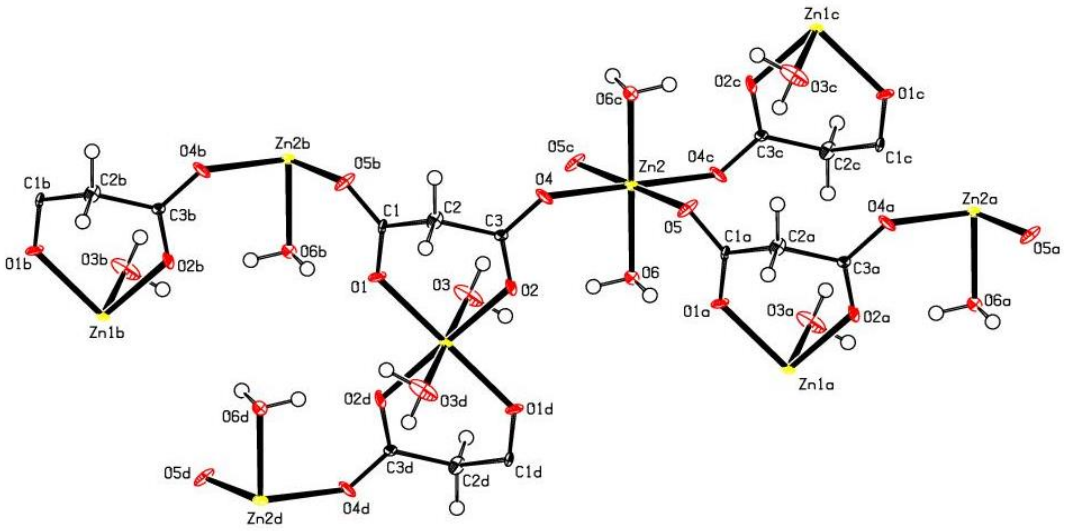

Fig. 1a The molecular structure of $[[Zn(H_2O)_2(Zn(mal)_2(H_2O)_2]_n$

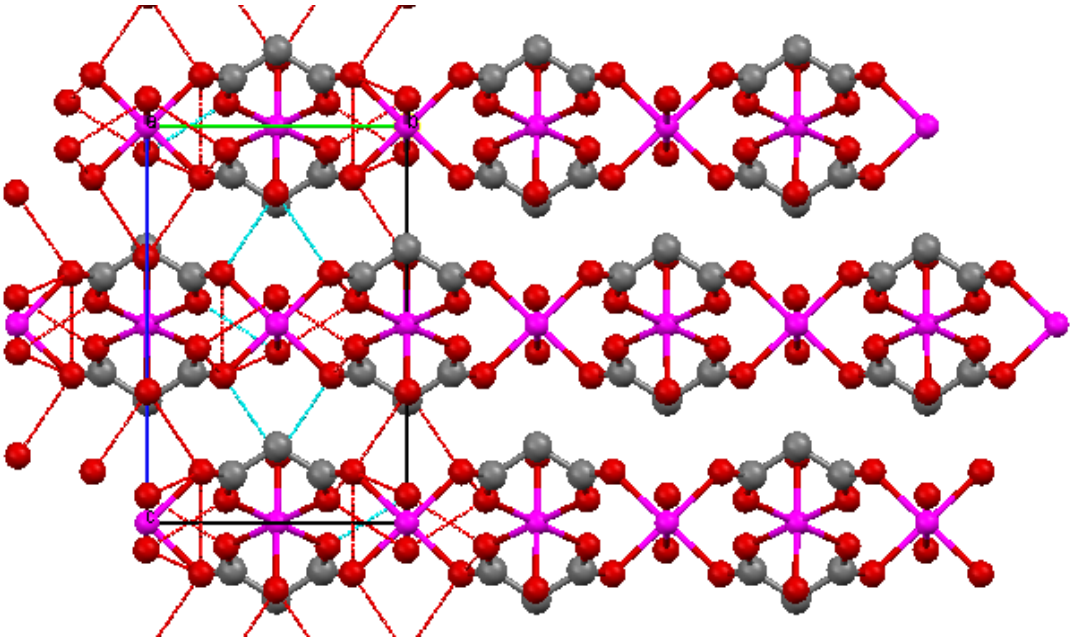

Fig. 1b: The molecular packing diagram for DZDBZ along b-axis in a crystal.

1	Zn(1)-O(2)	2.047(3)
2	Zn(1)-O(1)	2.047(3)
3	Zn(1)-O(3)	2.153(3)
4	Zn(2)-O(6)	2.086(2)
5	Zn(2)-O(4)	2.138(3)
6	Zn(2)-O(5)	2.146(3)

Table 1a: Bond length for DZDBZ $[[Zn(H_2O)_2(Zn(mal)_2(H_2O)_2]_n$

1	O(2)-Zn(1)-O(1)	90.03(9)
2	O(2)-Zn(1)-O(3)	92.27(12)
3	O(1)-Zn(1)-O(3)	91.84(12)
4	O(6)-Zn(2)-O(4)	94.00(11)
5	O(6)-Zn(2)-O(5)	92.92(11)
6	O(4)-Zn(2)-O(5)	92.71(9)
7	C(3)-O(2)-Zn(1)	127.6(3)
8	C(1)-O(1)-Zn(1)	127.0(2)
9	C(3)-O(4)-Zn(2)	126.2(3)
10	C(1)-O(5)-Zn(2)	126.7(3)

Table 1b: Bond angles for DZDBZ $[[Zn(H_2O)_2(Zn(mal)_2(H_2O)_2]_n$

4. Results and discussion

4a. Optical absorption studies

Optical spectrum of Mn(II)/DZDBZ, recorded at room temperature is depicted in Fig 2. The spectrum exhibits five bands at 693, 558, 410, 342, 243nm. Fig 2 shows characteristic features of Mn(II) in octahedral symmetry. The absorption bands at 14 430, 17 921, 24 390, 29 239, 41 152 cm^{-1} are in the order of d-d transition of Mn(II) ion. From the nature and position of the band observed, these bands are attributed to Mn(II) in distorted octahedral symmetry. The first band is CT band and remaining four bands have been assigned to $^6A_{1g}(S) \rightarrow {}^4T_{1g}(G)$, $^6A_{1g}(S) \rightarrow {}^4E_g(G)$, $^6A_{1g}(S) \rightarrow {}^4E_g(D)$, $^6A_{1g} \rightarrow {}^4A_{1g}(G)$ transitions respectively, with the help of Tanabe Sugano diagram. The energy matrices for the d^5 configuration inclusive of Trees correction were given by mehra [11]. In the analysis of optical absorption spectrum, trees correction parameter has been included in addition to the crystal field parameter Dq and racah interaction parameters B and C. The values which give best fit with observed data are Dq = 800, B = 837 and C = 2905 cm^{-1}. The band data are well matched with reported in literature. The value of the interelectronic repulsion parameter B (837 cm^{-1}) obtained in the present work, when compared with the free ion value (960cm^{-1}), is decreased by an amount of 13%. This decreasing is caused by influence of bond covalency.

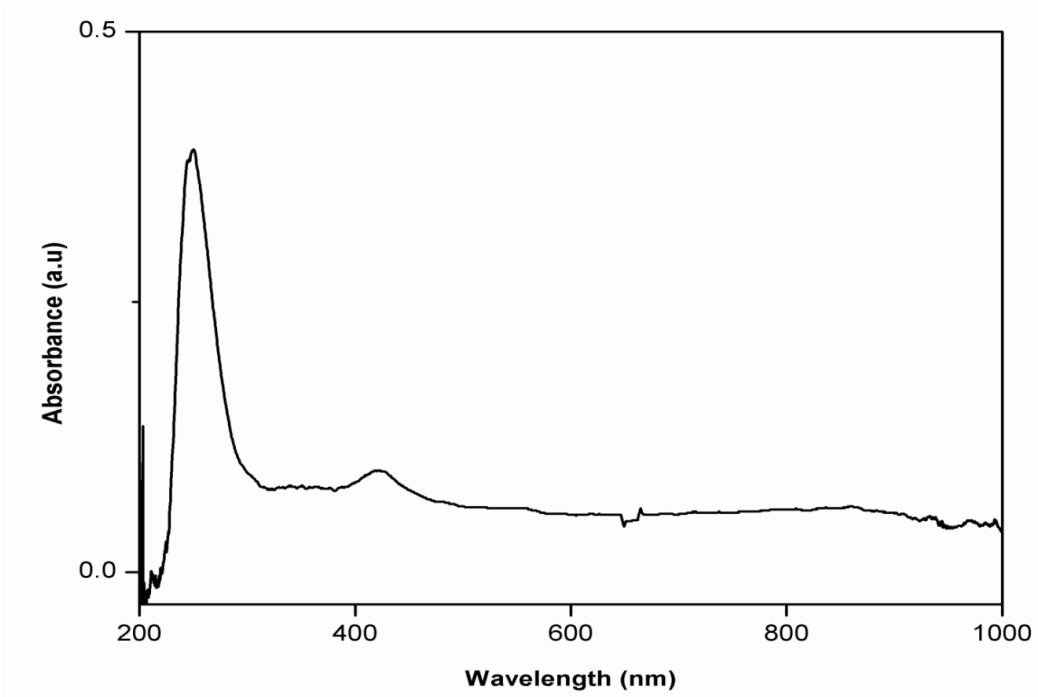

Fig. 2: Powder optical absorption spectrum of Mn(II) doped DZDBZ at room temperature.

4b. FT-IR and powder XRD

The FT-IR spectrum of DZDBZ and Mn(II) doped DZDBZ are recorded at room temperature and illustrated in Fig. 3. The FT-IR spectrum of DZDBZ shows characteristic bands for -OH, OH_2, COO-, -CH_2- and Zn-O [12]. FT-IR spectrum of Mn(II) doped DZDBZ also shows comparable characteristic bands with DZDBZ and slight wave number shift observed due to low concentration of Mn(II) impurity. The observed FT-IR bands and their tentative assignments for DZDBZ and Mn doped DZDBZ are depicted in Table 2a. The powder XRD pattern of Mn(II) doped DZDBZ is recorded at room temperature and depict in Fig. 4. Lattice parameter also calculated along with single crystal data of DZDBZ are listed in Table. 2b. According to the powder XRD measurements, the Mn(II)/DZDBZ has the identical lattice parameters as the pure DZDBZ, this clearly says that paramagnetic impurity does not rework the structure of DZDBZ due to low concentration of Mn(II) impurity.

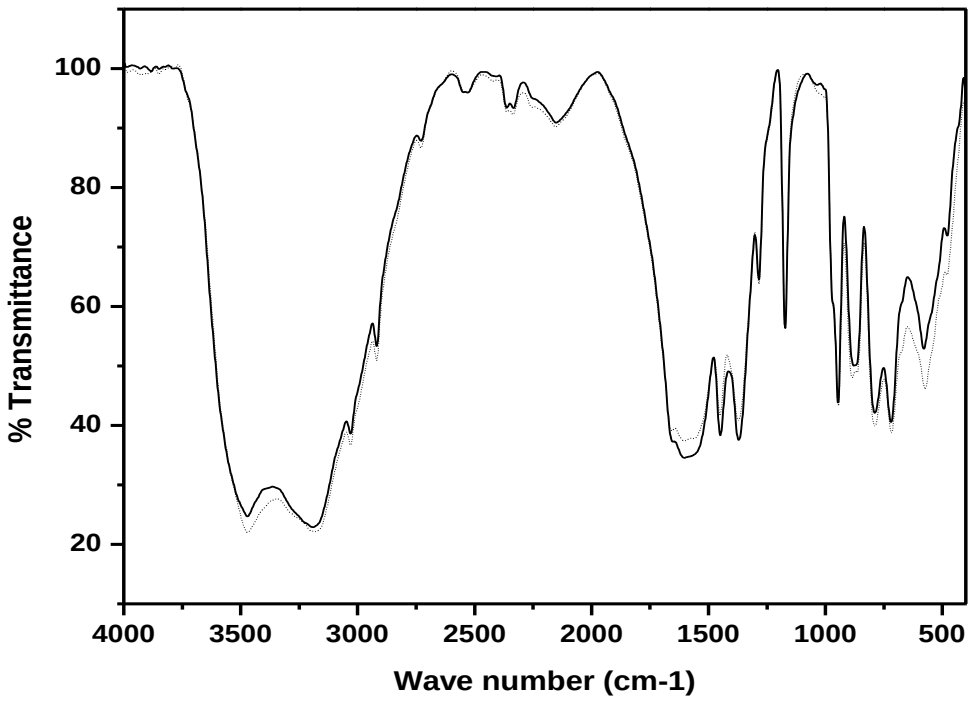

Fig. 3**:** FT-IR spectra of pure (top) and Mn(II) doped DZDBZ (bottom) at room

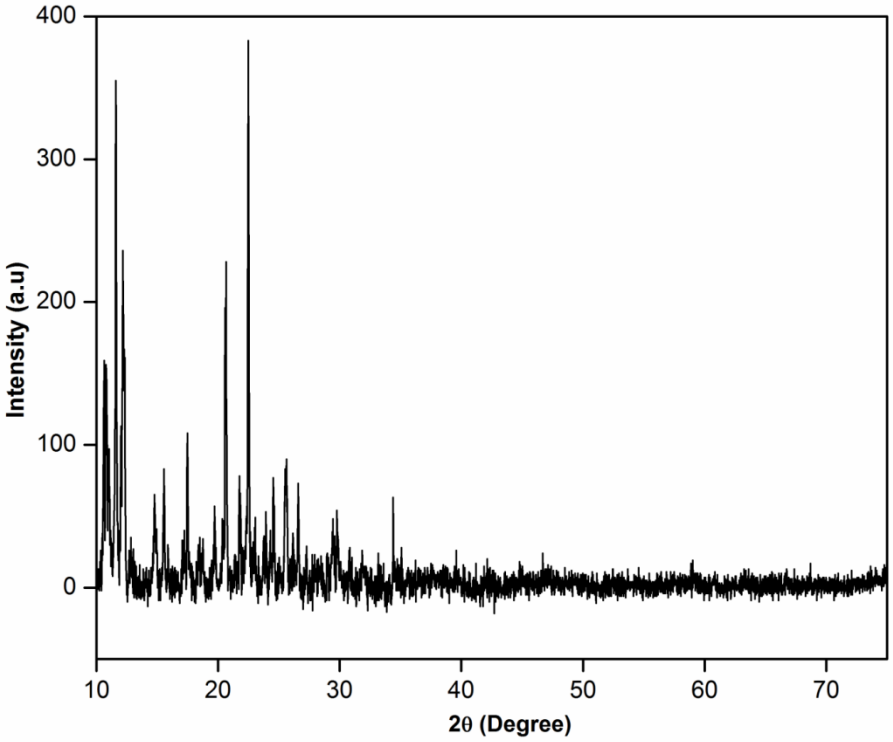

Fig. 4**:** Powder XRD pattern of Mn(II) doped DZDBZ.

Assignments	DZDBZ (cm^{-1})	Mn(II) /DZDBZ (cm^{-1})
Zn-O	722, 572	719, 563
Zn – O + O – C– O	793	791
(C = O) + (C – H)	1588	1591
OH_2	3246, 3105	3838, 3118
$-CH_2$	1184, 2851	1192, 2859
-OH	3471, 3874	3469, 3661

Table 2a**:** Observed FT-IR bands and their tentative assignments for DZDBZ and Mn(II) doped DZDBZ.

Lattice parameter (nm) of DBDBZ from single crystal XRD	Lattice parameters (nm) calculated from powder XRD	
DZDBZ	DZDBZ	Mn(II) doped DZDBZ
a = 0.7305	a = 0.7406	a = 0.7423
b = 0.7412	b = 0.7458	b = 0.7494
c = 1.1075	c = 1.0856	c = 1.0782

Table 2b**:** The calculated lattice parameters of DZDBZ and Mn(II)-doped DZDBZ from powder XRD, along with single crystal XRD of DZDBZ.

4c. EPR studies

Manganese ion having $3d^5$ electronic configuration with $^6S_{5/2}$ ground state (based on Hund's rule). In crystalline field low symmetry, the ground state splits into three Kramers doublet specifically ±1/2, ±3/2 and ±5/2. In the applied magnetic field, the degeneracy completely eliminated and it gives five fine structure transitions. Fig. 5 illustrates the schematic energy level diagram for Mn(II) ion showing electronic levels in zero and strong magnetic fields together with splitting due to nuclear spin. Each line will be further split into six hyperfine lines then totally it gives 30 lines [13-15]. A good shape with appropriate size Mn(II) doped DZDBZ single crystal is selected and fixed to EPR cavity. The EPR spectra are recorded by rotating the crystal in the magnetic field about three mutually perpendicular axes namely a, b, c* axes for every 10° interval. Here a and b is crystallographic axes a and b, c* is perpendicular to axis b and a. Single crystal EPR spectrum of Mn(II) doped DZDBZ at room temperature shows five set of six lines each. Due to interaction of electron spin (S = 5/2) and nuclear spin ^{55}Mn (I = 5/2) resulting 30-line pattern. When the crystal Mn(II) doped DZDBZ c* axis parallel to applied magnetic field (B), the observed EPR spectrum is shown in Fig. 6a. Two more spectra are resulted when the crystal is rotated in planes bc* and ab are shown in Fig. 6b and Fig. 6c. The widespread high spin Mn^{+2} have S = 5/2 and I = 5/2, in the absence of applied magnetic field the ground state $^6S_{5/2}$ splits into three Kramers doublet levels

resultant to $|\pm 1/2\rangle$, $|\pm 3/2\rangle$, $|\pm 5/2\rangle$, with spacing 2D and 4D respectively, where D is zero field splitting parameter. When an external magnetic field is applied, these doublets split and transition between them, i.e., $|-5/2\rangle \rightarrow |-3/2\rangle$, $|-3/2\rangle \rightarrow |-1/2\rangle$, $|-1/2\rangle \rightarrow |+1/2$, $|+1/2\rangle \rightarrow |+3/2\rangle$ and $|+3/2\rangle \rightarrow |+5/2\rangle$ give rise to five fine structure lines resulting in 30-lines pattern. In some of orientations more than 30 lines are noticed indicating the presence of more than one site. However, the second site could not be followed due to its weaker intensity and overlying with first site during crystal rotations. It is almost impossible to follow during all the rotations. A plots of angular variation EPR spectrum of Mn^{+2} doped DZDBZ single crystal in the ac* and ab planes are shown in Fig. 6a and 6b. In those figures, the solid line represents theoretical and solid point represents experimental values. A systematic study of angular variation plots of EPR spectra will give information regarding the principal axes of the complex that Mn(II) in the form in the crystal. Fig. 6a clearly elucidates that low field and high field transition are completely resolved in ac* plane. The isofrequency plot of Mn(II) doped DZDBZ in ab plane shows (Fig 7a-7c) the fine structure lines do not cross because D_{xx} and D_{yy} have same sign. The angular variation of fine structure and hyperfine lines in the two orthogonal planes are fitted with the help of program EPR-NMR to the spin Hamiltonian [15] (including second order effects).

$$H= \beta(g_xB_xS_x + g_yB_yS_y + g_zB_zS_z) + (A_xS_xI_x + A_yS_yI_y + A_zS_zI_z) +D [S_z^2-1/3S(S+1)]+E [S_x^2-S_y^2]$$

Here first term represent the Zeeman energy, and the second term is due to hyperfine interaction. The axial and rhombic components of the zero field splitting are represented by the third and fouth terms. S_x, S_y, S_z are the spin operators with respect to the cubic field axes. The parameters D and E are zero field splitting due to rhombic and axial crystalline field matrix and E represents the deviation from the axial symmetry. Using the above equation to calculate spin Hamiltonian parameters are shown in Table 4 along with respective direction of cosines. From Table 4 clearly says that g/A/D is nearly coincident, and additional geometry of Mn(II)/DZDBZ is distorted octahedral symmetry.

The value of D is relatively huge than found for normal Mn(II) complexes. In order to classify the position of the Mn in DZDBZ, the direction cosines of various Zn-O bonds have been calculated from X-ray data (assuming similar structure for DZDBZ) and given in Table 4 it shows the direction cosines of g/A values is matches with direction cosines Zn-O(2) was obtained from crystallographic data, it indicates that the paramagnetic transition metal ion namely Mn(II) ion present in the lattice substitutionally in place of zinc. The road maps simulated for two planes and agree well with the experimental one. The spin Hamiltonian parameters observed from single crystal analysis are further confirmed by taking polycrystalline EPR spectrum. The powder EPR spectrum of Mn(II)/DZDZB is shown in Fig. 8. The calculated spin Hamiltonian parameters are: g = 2.0078, A = 9.6 and D = 52.24 mT. These values are almost close to those parameters acquired from single crystal analysis. The powder EPR spectrum is simulated using these values which confirm the accuracy of the evaluated spin Hamiltonian parameters is shown in Fig. 8. The spin Hamiltonian parameters obtained for Mn(II) doped DZDZB are summarized in Table. 4. These values are good agreement with literature values [16-19]

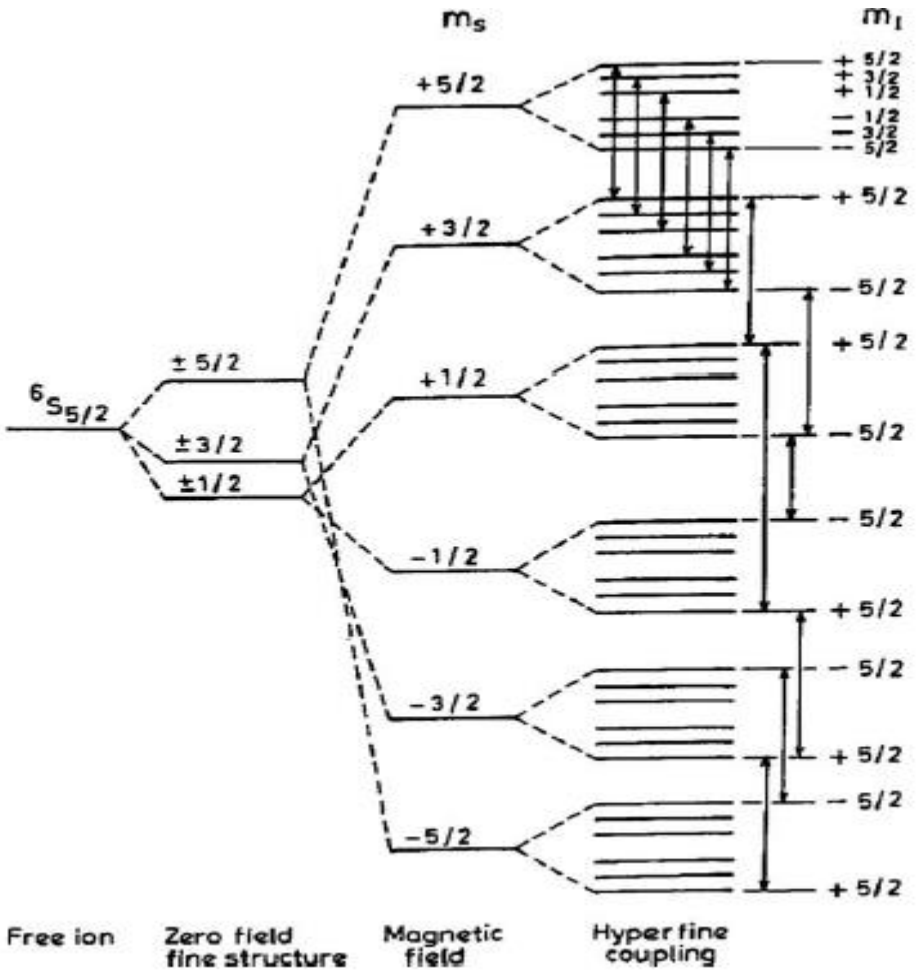

Fig 5: The schematic energy level diagram for Mn(II) ion showing electronic levels in zero and strong magnetic fields together with splitting due to nuclear spin. In the present work, the hyperfine structure (hfs) observed at g = 2.0 at room temperature.

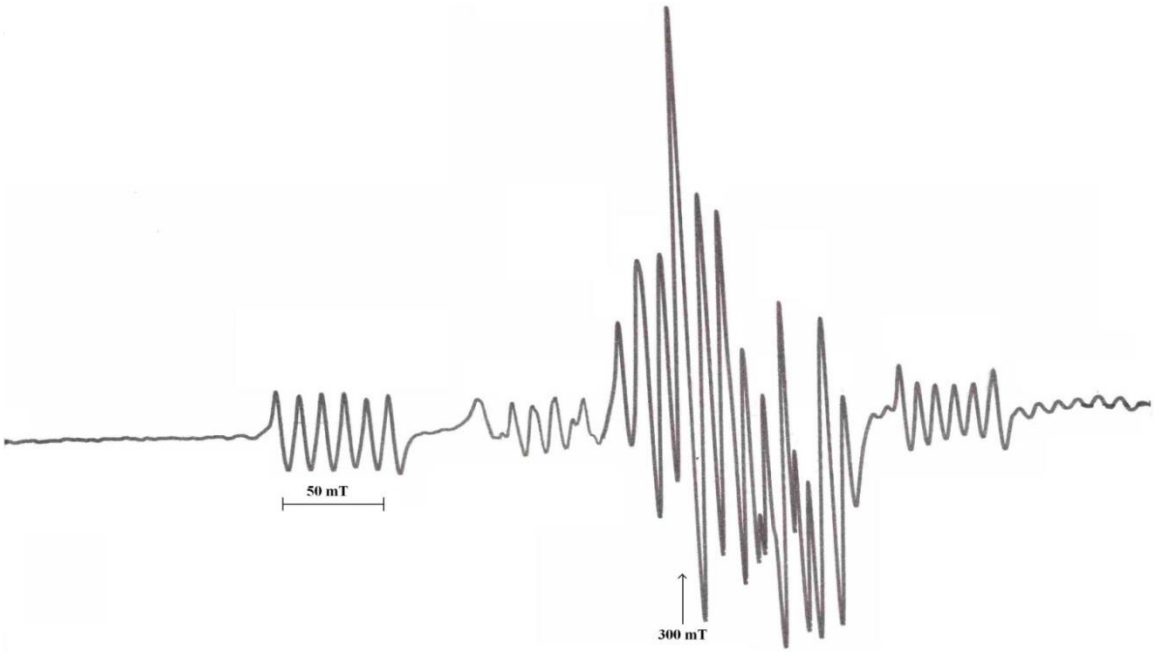

Fig. 6a: Single crystal EPR spectrum of Mn(II) doped DZDBZ, when B is parallel to axis c*. Frequency = 9.05508 GHz.

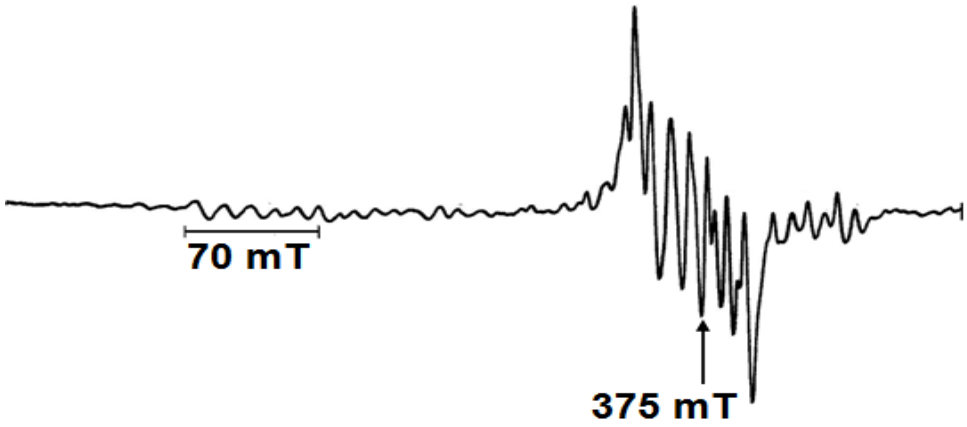

Fig. 6b: Single crystal EPR spectrum of Mn(II) doped DZDBZ, when B is parallel to axis b. Frequency = 9.05859 GHz.

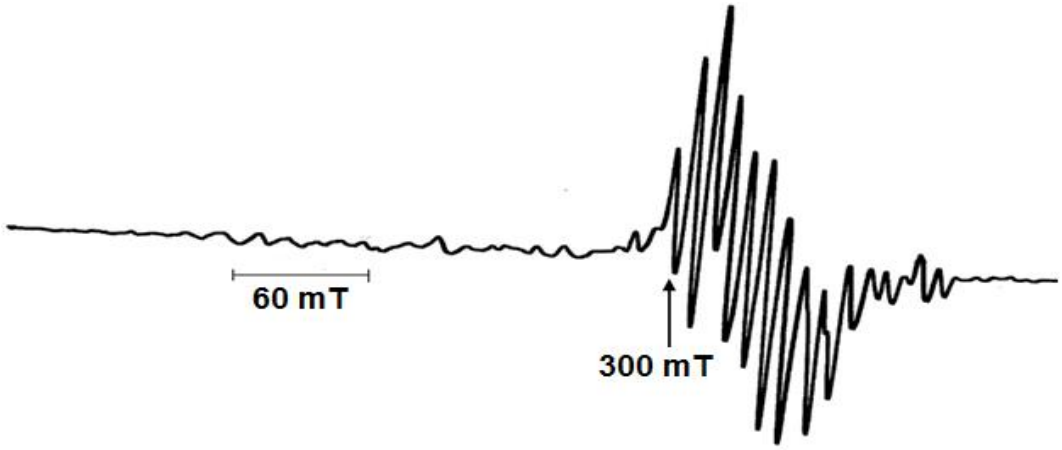

Fig. 6c: Single crystal EPR spectrum of Mn(II) doped DZDBZ, when the applied magnetic field (B) is parallel to axis a. Frequency = 9.05911 GHz.

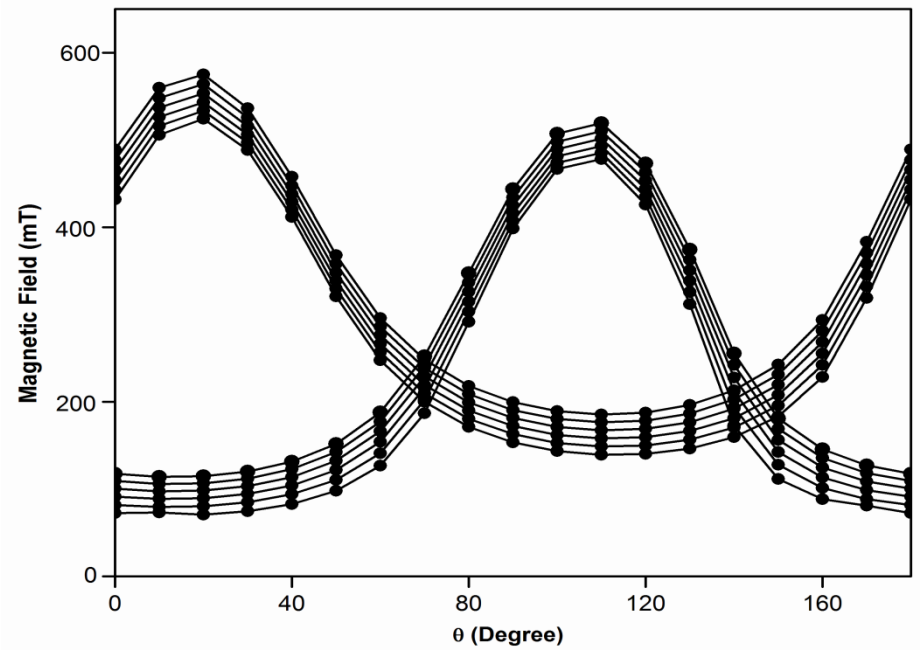

Fig. 7a: Angular variation plot of Mn(II) doped DZDBZ in the ac* plane. Frequency = 9.05869 GHz. Here and Fig.4b, solid circles represents to experimental points, whereas solid lines are theoretically calculated. Here ±5/2> ↔ ±3/2> transition only shown because ±3/2> ↔ ±1/2> and +1/2> ↔ -1/2> transitions were difficult to follow due to overlap of the intermediate transitions with the transitions of other site.

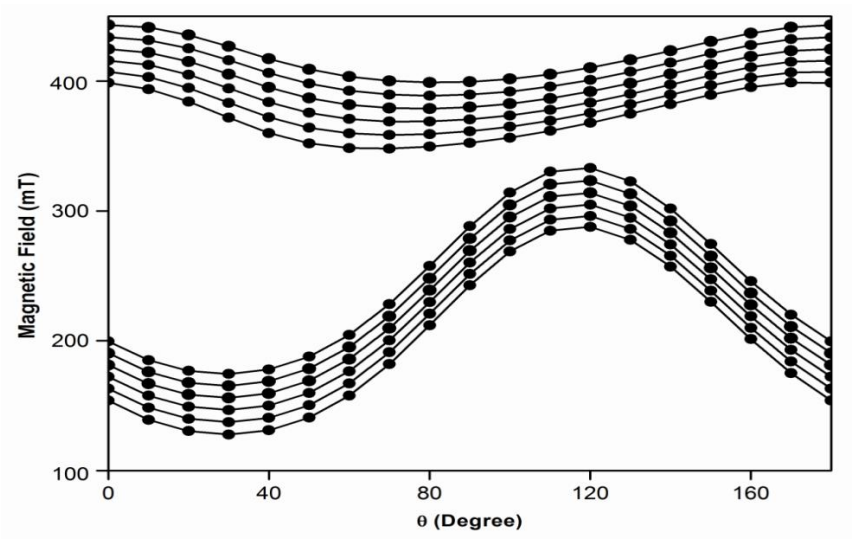

Fig. 7b: Angular variation plot of Mn(II) doped DZDBZ in the ab plane. Frequency = 9.05911 GHz.

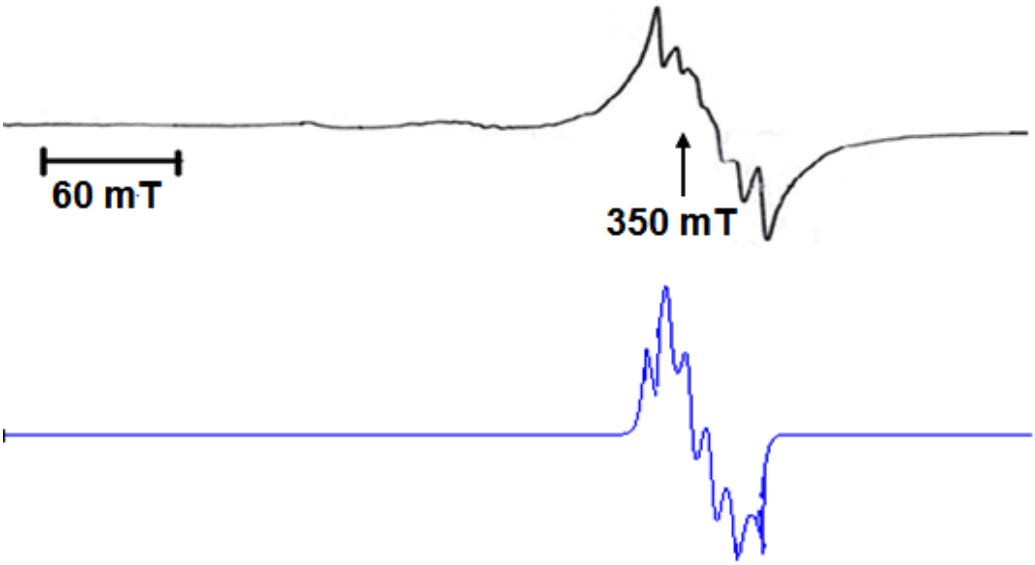

Fig. 8: EPR spectrum of powder sample of Mn(II) doped DZDBZ at room temperature (top) whereas the bottom one corresponds to simulated spectrum using SimFonia program. Frequency = 9.06871 GHz.

g matrix	Principle values			Direction cosines a	b	c*
2.028	0.001	0.020	1.997	-0.7082	0.2216	0.6808
	1.992	0.001	2.004	-0.5816	0.7012	0.4126
		2.012	2.008	-0.3596	0.6795	0.6471
A matrix (mT)						
8.35	-0.10	0.14	8.32	-0.7192	0.2336	0.6542
	8.67	-0.38	8.54	0.5948	0.6936	0.4062
		9.55	9.74	0.3588	0.6813	-0.6379
D matrix (mT)						
23.1	7.3	-19.5	35.4	0.8192	0.2488	0.5184
	10.1	-16.3	7.46	-0.4590	0.8516	0.2529
		-33.2	-42.85	-0.3724	0.0306	0.9344

Table.3: The spin Hamiltonian parameters obtained from the single crystal rotation for the Mn(II) doped DZDBZ using program EPR-NMR [15]

M-L bond	Direction cosines		
	A	B	c
Zn(1)-O(1)	-0.3139	0.6504	0.6919
Zn(1)-O(1)w	0.4338	0.0289	-0.9014
Zn(2)-O(2)	0.8301	0.1035	0.5493
Zn(2)-O(2)w	0.3482	0.0078	-0.9350

Table 4**:** The direction cosines of Zn -O obtained from the crystallographic data.

4d. Position of the Mn(II) ion in DZDBZ

The crystal structure of Diaquazinc(diaquabismalonato)zincate (DZDBZ) is belongs to monoclinic with space group C2/m and containing two atoms per unit cell (see Fig.1a). In this structure, both the zinc atoms are six coordination with slightly distorted octahedral geometry. Coordinated water molecule in the apical position and four oxygen atom from two [at Zn(1)] and four [at (Zn(2)] malonato ligand in the equatorial plane, they have familiar occurrence for syn-anti geometry. The $3d^5$ ion with s = 5/2 and I = 5/2 exhibits thirty hyperfine lines from a single crystal. Mn+2 may be entered into the lattice

by substitutionally or interstitially. The direction cosines of the Zn-O_w and Zn-O_m (w-water, m-malonato) bonds obtained from single crystal XRD are tabulated in Table 4. The direction cosines of principle g and A values are almost matches with the direction cosines of Zn(1)-O_w(1) bond of DZDBZ. The deviation between the directions was around 5. This reveals that the impurity has entered the lattice in substitutional position. The ionic radii of Zn (0.074 nm) is being smaller as compared to Mn (0.089 nm), therefore the manganese ion fits to enter the lattice substitutionaly.

4e. Covalency of metal ligand bonds

The covalency of the bond between manganese and oxygen's ligand can be calculated using matumura's plot. The covalency of a bond between manganese and its ligands depends on the magnitude of the isotropic hyperfine coupling constant " A" .An approximate relationship for the covalency of a bond between the atom p and q and their electro negativities χ_p and χ_q is given.

$$C = [1 - 0.16(\chi_p-\chi_q)-0.035(\chi_p-\chi_q)^2]/n$$

Here, n is the number of neighboring atoms surrounding the Mn(II) ion. Using the values χ_{Mn} = 1.55 and χ_{O} = 3.44, (Pauling's scale) and the percentage of covalency obtained for our case using the above equation is 8.5%, indicating that compound was almost ionic nature. Also, the covalency of the bond between manganese and its ligands will influence the magnitude of the isotropic hyperfine coupling constant. The hyperfine coupling constant A obtained from Matamoras's plot matched well with the calculated value.

5. Conclusion

Homobimetallic zinc malonato complex have been synthesized. The structure of the complex have been confirms by single crystal XRD and FT-IR. Homobimetallic zinc malonate complexes have selected as good diamagnetic host lattice to incorporate Mn(II) has dopant. Single crystal rotations have been performing three orthogonal planes carried out room temperature. EPR spectra of Mn(II) doped DBDBZ have been studied at laboratory temperature. The EPR magnetic tensor parameter g, A, D, E have been

obtained from single crystal rotation in three orthogonal planes. The location of the Mn(II) present in the host lattice substitutionally in place of zinc(II) ion. The magnitude of the hyperfine splitting constant A indicates that the bonding between paramagnetic ion and the ligands are ionic nature. The large D and E values reveals that distortion present in the crystal lattice due to steric effect of the crystal packing caused by dicarboxylic acid ligand. The optical spectrum have helped to calculate crystal field splitting parameter Dq and Racah interelectronic repulsion parameters B and C also have been evaluated. FT-IR and powder XRD are assisting to reconfirm the molecular structure of DBDBZ.

Acknowledgements

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DIFFERENTIAL CROSS SECTION CALCULATIONS AT (N)NLO ACCURACY FOR THE W BOSON PLUS JET PRODUCTION IN PROTON-PROTON COLLISIONS AT 13 TEV

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Abstract

We present a phenomenological study of the higher-order differential cross section calculations for the W boson production in association with a jet in proton-proton collisions at a center-of-mass energy of 13 TeV. The differential cross sections are calculated in the fiducial phase space at next-to-leading order (NLO) and next-to-NLO (NNLO) accuracies in perturbative quantum chromodynamics (QCD) for the electron decay channel of the W boson. The (N)NLO calculations are performed by using the q_T-subtraction method to regularize the infrared divergences that arise at the intermediate stages of the cross section calculations. The cross sections are predicted differentially as functions of several important observables that are potentially sensitive to the inclusion of the higher-order correction terms in the perturbative expansion. The differential cross sections are presented as functions of the W boson transverse mass, transverse momentum of the first leading jet, the rapidity of the first leading jet, the transverse momentum of the (anti)electron, and the pseudorapidity of the (anti)electron at both NLO and NNLO accuracies. The NNLO-to-NLO ratios of the predictions are also provided to assess the impact of the inclusion of the higher-order corrections in QCD. The theoretical scale uncertainties are also estimated to account for the missing higher-order corrections in the calculations. The differential distributions are reported along with the corresponding scale uncertainties. The predicted differential cross sections are generally improved in precision in the NNLO calculations. The results suggest that the differential cross sections for the W boson plus jet process can be predicted with less than a few percent theoretical scale uncertainties.

Key words: High Energy Physics, perturbative QCD calculations, W bosons, higher-order differential cross sections, (N)NLO fixed-order calculations

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INTRODUCTION

Electroweak vector boson (W or Z boson) production in association with hadronic jets plays an important role at hadron colliders such as at the CERN Large Hadron Collider (LHC). W boson production in association with jets (W+jets) in leptonic decay channels has large production rates and offers clean experimental signatures in proton-proton (pp) collisions at the LHC. W+jets production enables precision tests of the Standard Model (SM) physics and provides substantial inputs for constraining parton distribution functions (PDFs) in the proton. W+jets process constitutes a major background for Higgs boson production and rarer SM processes such as single top quark and top quark pair productions. W+jets process is also a major background for the searches beyond the SM such as dark matter and supersymmetry. Precise understanding of this process results in an improvement of background modeling for rarer SM and beyond the SM processes. Moreover, this process can be used to test predictions from Monte Carlo based event generators and fixed-order perturbative quantum chromodynamics (QCD) calculations. This process has been also used for detector calibration in terms of improving missing transverse energy, jet, and lepton performances from an experimental point of view. In the LHC experiments, the W boson is reconstructed experimentally by using its leptonic final states as $W \rightarrow \ell\nu$, where ℓ refers to lepton (electron and muon) and ν refers to neutrino escaping from the detector in the form of missing energy signature.

W+jets process has been characterized by means of measurements of differential production cross sections in pp collisions at the LHC as functions of various kinematical and geometrical observables. The differential cross sections have been measured at different center-of-mass energies by using important observables of the decay products of the W boson and the associated jets. The differential measurements have been performed more recently at 8 TeV (Khachatryan et al., 2017, Aaboud et al., 2018, Aaboud et al., 2017, Aaij et al., 2016), and 13 TeV (Sirunyan et. al., 2017) by the ATLAS, CMS, and LHCb Collaborations at the LHC. In all these complementary measurements, measured W+jets data based on different integrated luminosities are compared with various predictions from Monte Carlo simulations and fixed-order perturbative QCD calculations consisting of next-to-leading order (NLO) and next-to-NLO (NNLO) corrections beyond the leading order (LO). The experimental precision has been improved remarkably with the analysis of larger pp collision data sets and by using new analysis methods in these measurements.

W+jets differential cross sections need to be predicted by the higher-order theoretical calculations at NLO and NNLO accuracies in perturbative QCD to be able to describe the precise experimental measurements. The higher-order theoretical calculations require inclusion of QCD radiative correction terms in the perturbation theory. In this report, NLO and NNLO calculations for the W boson production in association with a jet (W+jet) process are computed by using the MATRIX framework (Grazzini, Kallweit and Wiesemann, 2018, Catani et al., 2009). The MATRIX framework allows computations of cross sections in a realistic fiducial phase space differentially in some important observables. In the cross section computations, a novel approach transverse momentum q_T-subtraction method (Catani and Grazzini, 2007, Catani et al., 2012) is used to cancel infrared divergences that arise in the intermediate stages of the calculations. The q_T-subtraction method is based on the q_T-resummation calculations which are available in the related literature. In this report, a summary of the phenomenological results of the recent paper (Ocalan, 2019) performed for the W+jet process in its electron decay channel at 13 TeV pp collisions, are presented. The W+jet differential

cross sections are calculated at NLO and NNLO accuracies in perturbative QCD as functions of the W boson transverse mass m_T, transverse momentum of the first leading jet $p_T(j1)$, the absolute rapidity of the first leading jet $|y(j1)|$, the transverse momentum of the (anti)electron $p_T(e)$, and the absolute pseudorapidity of the (anti)electron $|\eta(e)|$. The theoretical uncertainties due to missing higher-order corrections in the calculations are also estimated and reported along with the central differential results.

PROCESS SETTINGS AND FIDUCIAL SELECTIONS

The (N)NLO computations are performed with the MATRIX framework by using the q_T-subtraction method. In the q_T-subtraction method, a residual dependence parameter r_{cut} is used to regularize the infrared divergences in the perturbative expansion. The choices of r_{cut} = 0.15% and the extrapolation limit $r_{cut} \rightarrow 0$ are employed in the computations. Furthermore, central scales for the renormalization and factorization scales are chosen to be the physical mass of the W boson as $\mu_R=\mu_F=m(W)=$ 80.38 GeV. The theoretical uncertainties are estimated by varying the scales μ_R and μ_F by a factor of 0.5 and 2.0 while imposing the constraint as $0.5\leq\mu_R/\mu_F\leq2.0$. The numerical uncertainties are treated negligible in this work as they make up less than 1% of the estimated scale uncertainties. The PDF sets NNPDF30_lo_as_0118, NNPDF30_nlo_as_0118, and NNPDF30_nnlo_as_0118 are used from the NNPDF Collaboration at appropriate perturbative order. The PDF sets are all based on a constant strong coupling $\alpha_s(m_Z)$ = 0.118 assuming an electroweak scale specified by the physical Z boson mass.

The fiducial phase space requirements are employed in the computational setup to be in line with the real selection cuts that have been used at the LHC experiments for the W+jet differential cross section measurements. The fiducial phase space selection includes geometrical and kinematical acceptance requirements on the final state decay products of the W boson and the associated hadronic jet. The fiducial selection cuts that are imposed for the differential and fiducial cross section calculations of the $pp \rightarrow W \rightarrow ev + X$ process at 13 TeV requires isolated electrons with transverse momentum $p_T(e)>25$ GeV and absolute pseudorapidity $|\eta(e)|<2.4$ as well as the W boson transverse mass as $m_T(W)>50$ GeV. The W boson transverse mass selection is needed on the experimental side to suppress QCD multijet background events to W+jets signal production. In addition, the jets are required to have $p_T(j)>30$ GeV within the absolute rapidity $|y(j)|<2.4$. The jets are defined by means of the anti-k_T clustering algorithm with a cone sine of $\Delta R=0.4$. A more detailed discussion on the computational setup and fiducial acceptance cut requirements are given in Ref. (Ocalan, 2019).

PHENOMENOLOGICAL RESULTS

The 13 TeV differential cross sections as a function of the m_T variable for the W+jet process are calculated at (N)NLO in the fiducial phase space. The differential cross sections are predicted for the W^+ and W^- processes separately in the m_T range of 0-1000 GeV and are given in Table 1. The cross sections are predicted more precisely for the signal region of $m_T>50$ GeV in the NNLO calculations than the NLO calculations. The scale uncertainties for this $m_T>50$ GeV region are reduced to a few percent or less in the NNLO calculations. The differential cross sections are also predicted at NLO and NNLO for the $p_T(j1)$ and $|y(j1)|$ variables of the leading jet and compared among these accuracies. In these differential distributions, NNLO predicts noticeably higher cross sections over the entire kinematic regions of the jet variables. Differential distribution shapes are quite consistent between NLO and NNLO, except for higher ranges of $p_T(j1)$ variable, where higher tails for the $p_T(j1)$ variable are predicted by the NNLO calculations. Precision is

improved in going from NLO to NNLO calculations. The details of the discussion on the differential distributions for the jet observables are given in Ref. (Ocalan, 2019).

Table 1. The 13 TeV differential cross sections predicted at (N)NLO as a function of the W boson transverse mass m_T in the range 0-100 GeV. The up and down scale uncertainties are included in percent to the central results obtained.

$m_T(W)$ (GeV)	$d\sigma_{NLO}/dm_T(W)$ $W^+ + X \to e^+\nu_e + X$	$d\sigma_{NLO}/dm_T(W)$ $W^- + X \to e^-\bar{\nu}_e + X$	$d\sigma_{NNLO}/dm_T(W)$ $W^+ + X \to e^+\nu_e + X$	$d\sigma_{NNLO}/dm_T(W)$ $W^- + X \to e^-\bar{\nu}_e + X$
0–15	$0.13^{+11.97\%}_{-9.62\%}$ pb	$0.07^{+11.97\%}_{-10.00\%}$ pb	$0.37^{+20.75\%}_{-15.29\%}$ pb	$0.17^{+10.87\%}_{-8.86\%}$ pb
15–20	$0.84^{+11.97\%}_{-9.62\%}$ pb	$0.27^{+11.97\%}_{-9.62\%}$ pb	$1.45^{+12.95\%}_{-10.23\%}$ pb	$0.70^{+5.44\%}_{-5.36\%}$ pb
20–30	$2.85^{+11.97\%}_{-9.62\%}$ pb	$2.59^{+11.97\%}_{-9.62\%}$ pb	$5.31^{+15.05\%}_{-11.59\%}$ pb	$4.74^{+13.90\%}_{-10.84\%}$ pb
30–40	$9.45^{+11.97\%}_{-9.62\%}$ pb	$6.03^{+11.97\%}_{-9.62\%}$ pb	$14.80^{+8.54\%}_{-6.87\%}$ pb	$9.79^{+8.23\%}_{-7.16\%}$ pb
40–60	$732.04^{+4.44\%}_{-6.52\%}$ pb	$571.24^{+4.23\%}_{-5.33\%}$ pb	$672.53^{+3.40\%}_{-3.67\%}$ pb	$643.80^{+1.37\%}_{-2.44\%}$ pb
60–100	$115751.00^{+2.91\%}_{-5.02\%}$ pb	$88541.02^{+3.01\%}_{-5.18\%}$ pb	$118795.92^{+0.91\%}_{-0.90\%}$ pb	$91113.38^{+0.85\%}_{-1.04\%}$ pb
100–1000	$76.16^{+2.81\%}_{-4.29\%}$ pb	$50.38^{+3.01\%}_{-4.58\%}$ pb	$82.64^{+1.86\%}_{-2.43\%}$ pb	$58.60^{+2.01\%}_{-2.53\%}$ pb

The differential distributions are also predicted for the (anti)electron $p_T(e)$ and $|\eta(e)|$ variables to assess the sensitivity of inclusion of higher-order corrections in the perturbative QCD. The $p_T(e)$ and $|\eta(e)|$ differential distributions are compared between NLO and NNLO as shown in Figure 1 and Figure 2. The higher ranges of the $p_T(e)$ distributions turn out to be more sensitive to the inclusion of NNLO correction as the NNLO calculations predict higher tails in these distributions. The precision achieved in the NNLO calculations is higher for this variable as anticipated. The NNLO-to-NLO ratios are around ~1.5 for the intermediate ranges and rises up towards higher ranges. On the other hand, the sensitivity of the higher-order corrections for the $|\eta(e)|$ variable is not high in comparison to the $p_T(e)$ variable. The $|\eta(e)|$ distributions turn out to exhibit slight dependence on the higher-order QCD corrections. The intermediate region of this variable still discriminates between NLO and NNLO predictions. The NNLO-to-NLO ratios increase in the intermediate region up to ~1.15. In all these differential distributions, the scale uncertainties are generally reduced by going from NLO to NLO. In some regions of these variables the theoretical scale uncertainties are comparable between NLO and NNLO calculations.

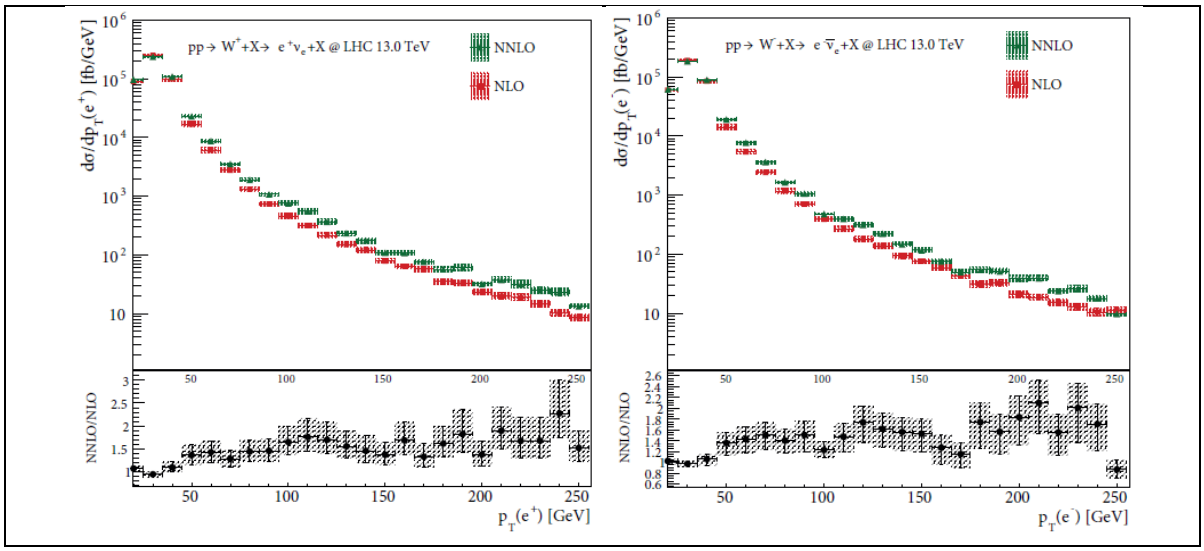

Figure 1. The predicted differential distributions for the $p_T(e^+)$ (left) and $p_T(e^-)$ (right) compared between NLO and NNLO predictions at 13 TeV. The scale uncertainties are shown as vertical error bars around central numbers.

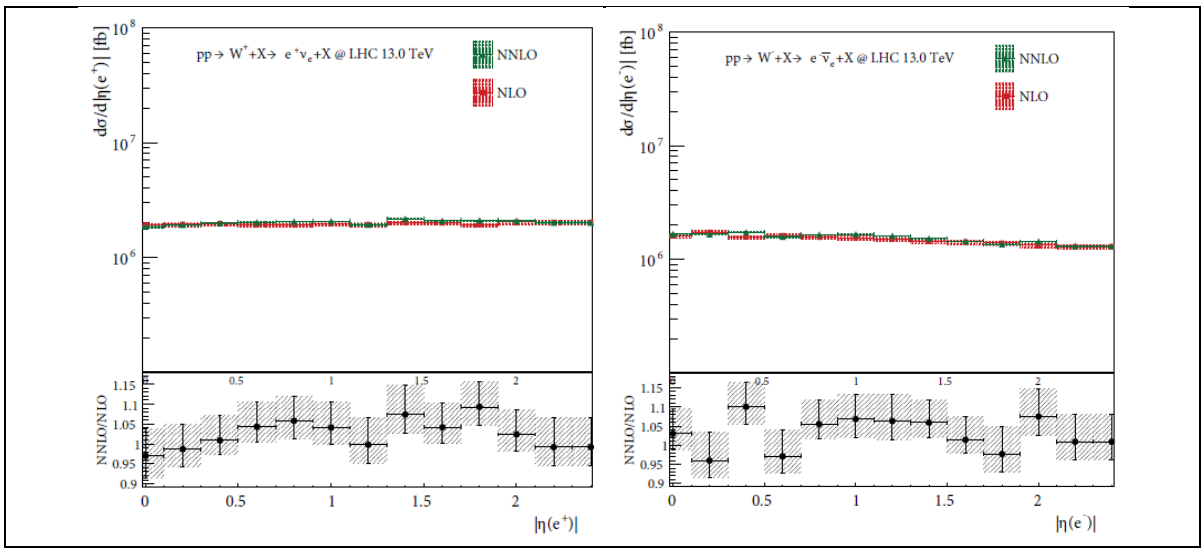

Figure 2. The predicted differential distributions for the $|\eta(e^+)|$ (left) and $|\eta(e^-)|$ (right) compared between NLO and NNLO predictions at 13 TeV. The scale uncertainties are shown as vertical error bars around central numbers.

SUMMARY

In this report, differential cross section predictions from NLO and NNLO calculations for the W+jet process are briefly overviewed based on the paper in Ref. (Ocalan, 2019). The differential predictions are presented for the W^+ and W^- bosons separately to assess the sensitivity of the included QCD corrections. The results are given in the fiducial phase space for the W^+ and W^- boson production in electron decal channel for 13

TeV LHC Pp collisions. The differential cross sections are predicted with improved precision for the W boson transverse mass region mT>50 GeV in the NNLO calculations. The differential predictions for the leading jet observables $p_T(j1)$ and $|y(j1)|$ are also overviewed as improving in precision in the NNLO calculations. In these differential distributions, the shapes of the jet variables are preserved between NLO and NNLO accuracies, whereas higher tails are predicted by the NNLO calculation in these distributions. Moreover, the differential cross section distributions are predicted for the (anti)electron variables $p_T(e)$ and $|\eta(e)|$ and compared between NLO and NNLO accuracies. The $p_T(e)$ distribution shapes are predicted higher in the NNLO calculations in comparison to NLO comparisons towards higher ranges. The $p_T(e)$ distributions are observed to exhibit sensitivity to inclusion of higher-order perturbative QCD corrections. The $|\eta(e)|$ distributions show slight dependence on the order of the calculations. The intermediate region of this variable still can be used to assess the level of the QCD correction included in the calculations. In all these differential cross section distributions, the NNLO calculations provided more accurate predictions for the variables for the bulk of the ranges. The results revisited in this report suggest that the higher-order cross section distributions predicted by relying on the qT-subtraction method can be used in near future experimental studies of data-to-theory comparisons.

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AN ANALYTICAL STUDY OVER BANGLADESHI LEARNERS' ATTITUDE TOWARD KOREAN LANGUAGE AS K-FAN IN 2020

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Abstract

The popularity of Korean language results from 'Hallyu' or 'Korean Wave,' the coinage for Korean entertainment culture. It came in the late 1990s as the wave first hit in China and Japan used the term first. The impact of glocalization of Hallyu is increasing day by day upon many aspects of life among young generation. K-ubiquity creates an overflowing popularity all over the world, regarding which a lot of studies have already been done. Bangladesh is also under the influence of Korean entertainment industry since 2009 or around. Youth of Bangladesh are fans of Korean pop culture as well as dramas as a result of cultural hybridization. Notably the highly passionate Korean language learners are involved in versatile economic sectors related to Korea. A number of K-pop cultural programs has been arranged by K-fans in Bangladesh. Therefore, I conduct the study particularly over Bangladesh as a need of 2020 to get an ultimate picture of K-fans attitude towards Korean language. A survey of more than 100 participants results an analytical comparison over Bangladeshi K-fans' attitude that aims for a further innovative curriculum of Korean language based on peoples' interests. Keenly observed facts in this survey are fields of interests behind learning Korean language. These facts reflect their inner views about Korean as a foreign language through various learning experiences. According to the survey results, the 66% youngsters of Bangladesh are interested to learn Korean language passionately by focusing on their individual motto of learning Korean. Therefore, through this work an average change in learning choice of Bangladeshi youth is obtained as an overview of 2020.

Keywords: attitude, Korean language, Bangladeshi, analysis, innovative curriculum idea

INTRODUCTION

Hallyu vibe generates vital changes in young peoples' interests impacting the social, personal as well as educational life. It has remarkable success of the historical drama 'Dae Jang Geum' ('Jewel in the palace'), 'Winter Sonata' and the pop song 'Gangnam Style' around the world as well as Bangladesh. According to the world's most influential music media brand Billboard (2017), Seo Taiji (Jung Hyun Chul) is known as the "President of Culture" in South Korea for his legendary 'Nan Arayo' ('I know') hip-hop performance in 1992 as the pioneer of today's K-pop culture. This vibe's acceleration is defined by Hallyu 1.0, 2.0, 3.0 and 4.0 eras (Kim, 2015). As fans become influenced by K-ubiquity through all the era of Hallyu, to term them as K-fan is obvious, rather than K-pop fan, K-drama fan or else. At this point, the popularity of Korean language become an issue of research, where its historical significance plays the most important role.

BACKGROUND

Hangeul or Hangul is the alphabet of Korean language, having 24 basic letters with 14 consonants and 10 vowels, which inherits traditional and historical importance. Since Sejong, the fourth king of Choson (Yi) dynasty, developed this official writing system in 1446 solving the communication problem of illiterate people. Korean language history describe the contemporary Korean period in the late nineteenth century (Lee and Ramsey, 2011, pp. 287-305). Singaporean learners are strongly motivated by Hallyu in learning Hangul as the largest of 15% of the total variance (Chan and Chi, 2010). In the United States, 42% find high

motivation and 40% find low motivation from K-pop among 129 learners desiring proficiency that 9.38% as native, 21.88% as fluent, 26.56% as conversational and 39.06% as basic (Damron and Forsyth, 2012). An Algerian study shows the 98.5% of 139 participants are attracted by Hallyu, where 99.3% of participants are influenced to use Hallyu products rather than Algerian ones. The language and behavior are two main influences, among the majority of them which encourage learning, as Korean is easy and rich with an expressive lexis (Touhami and Al-Abed Al-Haq, 2017). Korean language training institute in Wuhan has learners mostly influenced by Hallyu (Feng and Zhao, 2018). There are K-fans of 70.59 million from Asia and Oceania, 11.8 million from the Americas, 6.57 million from Europe, 230,000 from Africa and the Middle East. A total of 89.19 million of K-fans, having 1,843 communities outside of Korea, are from 113 countries around the world, according to 2018 data which is 22% more than 2017 data by Korea Foundation report (The Korea Times, 2019). According to Korea Economic Institute of America, 34.3% of students take language classes because of their interest on Korean pop culture at the King Sejong Institutes run by Korean government around the world (Gibson, 2020). K-fans of 70% are interested in Hangul among 117 respondents from 54 nationalities around the world (Akter, 2020). India has included Korean as a foreign language at the secondary level in country's new education policy of 2020 (Education Times, 2020).

According to Embassy of the Republic of Korea in People's Republic of Bangladesh (2016), Bangladesh participates in the annual "K-pop World Music Festival" since 2015. This festival, organized by the Ministry of Foreign Affairs of Korea in cooperation with the Korean Broadcasting System (KBS), creates the K-fan gathering platform from different countries since 2011. Bangladesh had 30 teams among 13,000 participants from around 70 different countries in "2016 K-pop World Festival Dhaka: 'Hallyu' breaks the ice to make its way to Bangladesh" at Bangladesh Shilpakala Academy organized by the Embassy along with RTV and the first Bangladeshi K-pop and Korean Culture Community created in 2010, the BD K-Family. One of the popular Bangladeshi English Daily, Dhaka Tribune (2017), featured on a popular store named 'Beauty Box from Korea' by Bangladeshi starter describing various Korean beauty products that refers the impact of Hallyu in Dhaka. The Daily Star (2015), one of the most impactful English newspapers of Bangladesh, marked the increasing popularity of K-drama in Bangladesh. Later, it (2018) describes the fandom started with K-music and gradually leading to K-drama, K-skincare and K-fashion that K-food culture, K-idols beauty culture, in a word, K-culture creates impact over Bangladeshi lifestyle as well as economy. Another Bangladeshi news platform, The Business Standard (2020) states that many Bangladeshi K-fan communities organize competition, celebration, get together, cosplay etc. among more than 50 thousand of fans.

METHODOLOGY

I conduct a survey from 09-01-2020 to 21-01-2020 with responses from 106 random Bangladeshi people of three types: K-fan, Unfamiliar with Hallyu, Not K-fan. Bangladeshi staying in South Korea have also enjoyed participating. I analyze three categories, Institutions, Age and Gender; under three objectives, (1) Creating overview of the popularity of Korean language, (2) To figure out motto and satisfaction over learning and (3) Analyzing the effectiveness of learning ways by K-fans' experiences. More than 65 varieties of participants' departments as well as institutions provide idea about the diversity in learning interest. They are, University of Dhaka: Applied Mathematics, Mathematics, English, Buddhist Studies, Public Administration, Anthropology, Law, Physics, Nuclear Engineer, Occupational and Safety Engineering, Chemistry, Banking and Insurance, Population Sciences, Zoology, International Business, Development Studies, Disaster Management and Vulnerability Studies, Geography, Management, Accounting and Information Systems, Soil, Water and Environment, IBA, MIS, Faculty of Business Studies, Institute of Social Welfare and Research, IER, Institute of Modern Languages: Chinese Language and Culture, Japanese Studies, Korean Language; Semyung University, Korea; University of Ulsan, Korea; Inha University, Korea: EE; Jahangirnagar University: Government of Politics; Home Economics: Food and Nutrition; Siddheshwari Girl's College: Accounting; North South University: BBA, MBA; Bangladesh Agricultural University; Faridpur Medical College; AIUB: MPH; Chittagong College: Statistics; National University: Bangla; International Islamic University, Chittagong: English; Daffodil International University;

Bangla College, Mirpur; Brac University: CSE; M. Abdur Rahim Medical College; IIUC; Dhaka City College; Independent University Bangladesh: Finance, Marketing, BBA; Anwar Khan Modern Medical College; RUET: EEE; ECE: EWU; United International University: BBA; Birshreshtha Noor Mohammad Public College; IUBAT: Mechanical Engineering; Begum Rokeya University: Marketing; Eden: Physics; Bangabandhu Sheikh Mujibur Rahman Agricultural University; Bangladesh University of Professionals: International Relations; Tejgaon College; Jogamaya Devi College: Assistant Professor; Schools. Age average is 22.79 where median and mode are 23. The 22 – 25 range is of 60.38% participants having more than 10% of participants per slot.

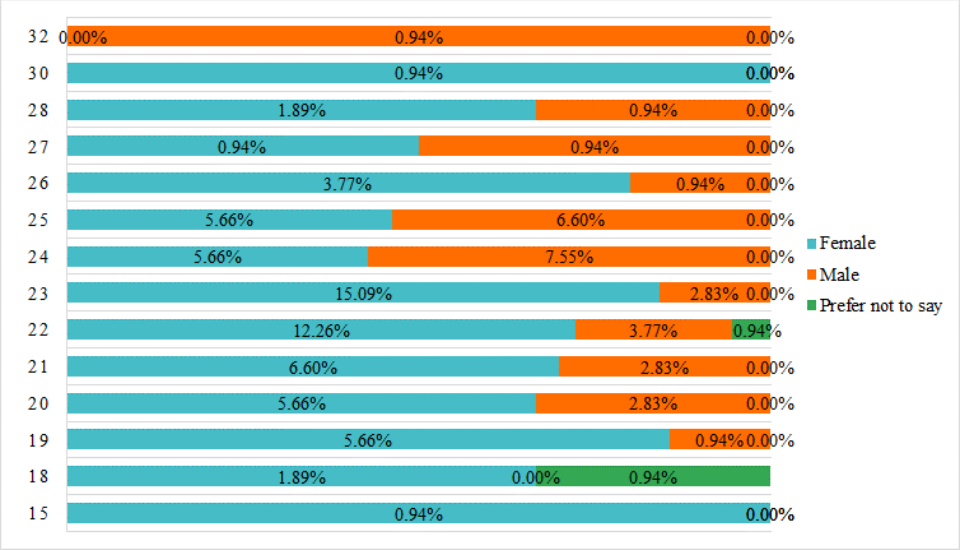

Figure 1. Age and Gender of Participants

RESULTS

A sharp observation through graphical data analysis provides the facts behind K-fans attitude toward language. The results of data collection are discussed below.

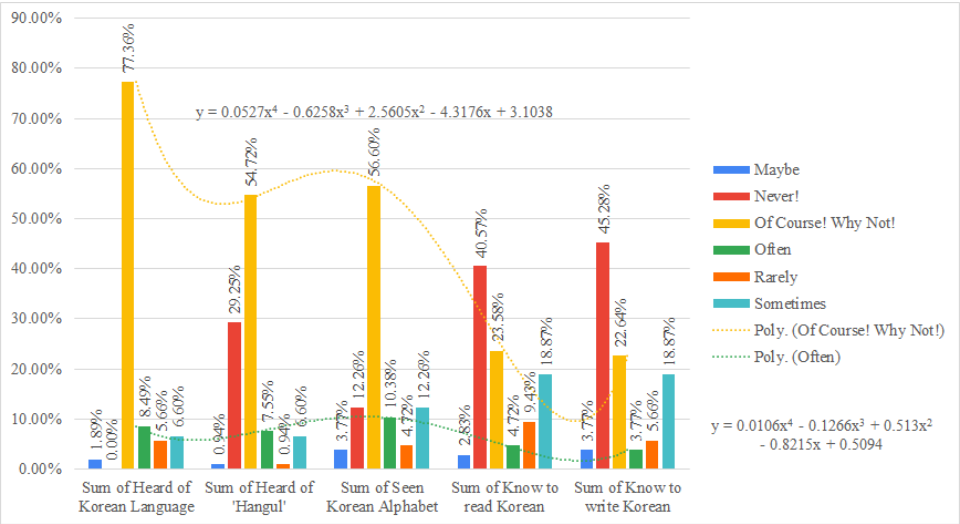

Figure 2. Fields of Interests for Hangul

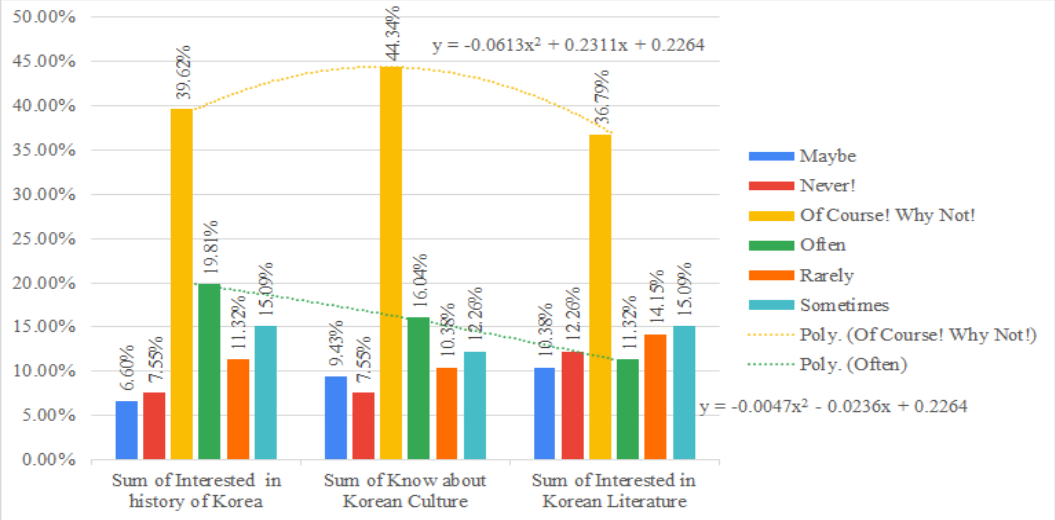

Figure 3. Fields of Interests for History, Culture and Literature

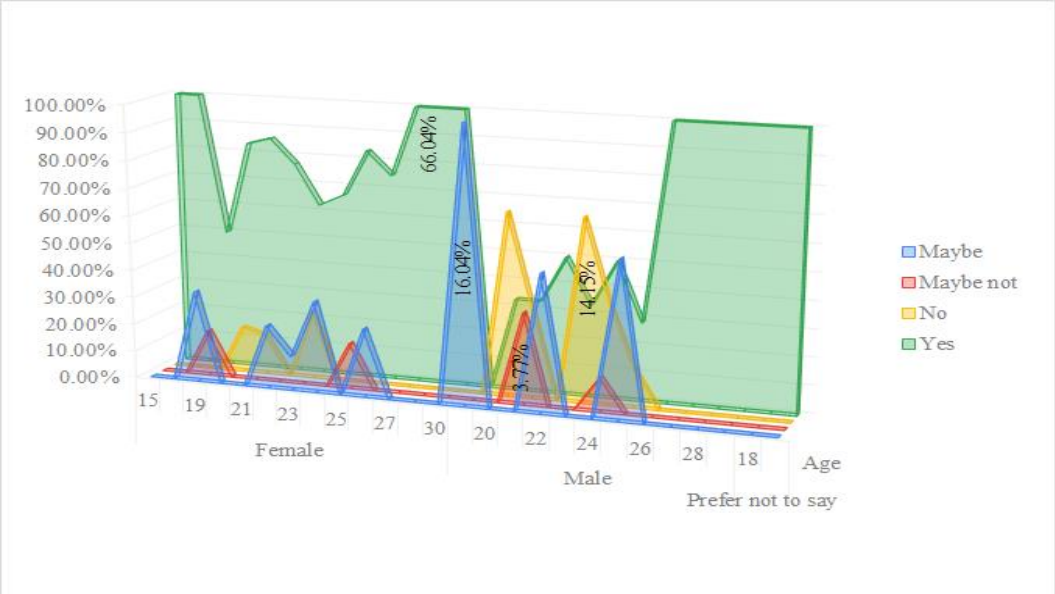

Figure 4. Korean Learning Interest

Motto of Learning Korean

K-fans specified their motto of learning this foreign language are: “I am learning Korean language because of my love for Korean language. And my motto is to explore more about Korean culture, literature and language”, “To understand K-pop stuffs without subs in the first place. But now maybe in the future if I can go there, I will love to learn Korean”, “I want to learn their language so that I can understand the drama and their music...”, “I want to know this language to some extent which can ease the communication maybe”, “I want to learn Korean language and culture, and want to visit there”, “I’m interested as a fan of K-pop & K-media... Also, for my future!”, “Talk to them with their own language when I would visit Korea”, “Want to meet my favorite actor”, “Just wanted to learn because learning languages is my hobby”, “Passion”, “I

think... I love to learn this. It's heard too sweet.", "Knowing more about them and feeling native to them", "I am learning Korean language for studying in Korea", "I love their culture, that's why I am interested", "I want to get TOPIK level 6 which is the highest!", "To go to South Korea for educational purposes", "To get in touch with the Korean community", "I love to learn different cultures.", "Go to South Korea to study and work", "To understand them", "To speak and write", "Becoming a part of technology advanced country", "Just to learn Korean for having fun", "To live comfortably in Korea", "To pass TOPIK", "No motto.", "Don't know".

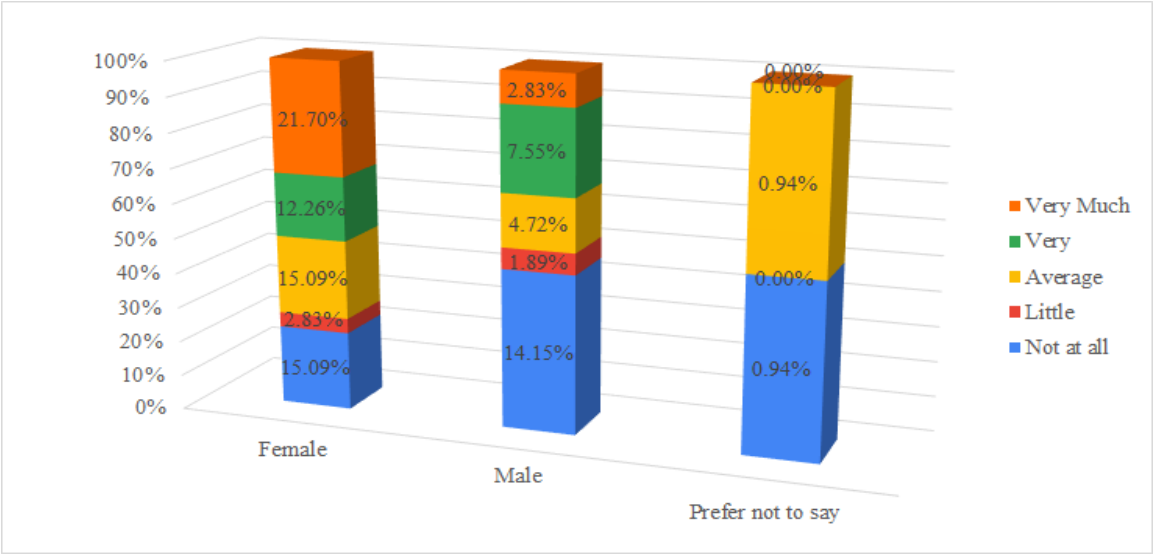

Figure 5. 100% 3-D Stacked Column for Satisfaction over Korean Learning

Figure 6. Effectiveness of Learning Ways

DISCUSSION

Learners' attitude as K-fan is obtained by combining the facts. Since K-fans are attracted by Hallyu, they are easily identifiable among all participants by the general questions in 'Fields of Interests'. K-fans are also interested into the significance of 'Hangul' (Figure 2). I connect two of the scales 'Of Course! Why Not!'

and 'Often' to get more accuracy by polynomial curves that establish the relationship through K-fans' interest types and levels in Figure 2 and 3. It shows that if K-fan is interested in K-history and K-literature s/he also knows about K-culture. Though by knowing about K-culture, one may or may not be interested in K-history or K-literature. Hence, there is a higher chance that K-fans will learn Korean language which is not obvious but a common fact for all K-fans. Participants who are not interested to learn it, may or may not be K-fans. However, Figure 4 estimation provides that total 82.08% under 'Yes' and 'May be' of K-fans are interested in learning. The understanding of entertainment program is found as major motto. Tourism or study abroad plan needs language proficiency which are also targeted. But the beauty of the language, K-fans enjoy mostly, is considered first that attracts them regardless of any motto. Since the alphabet 'Hangul' is scientifically easy to learn, most of the passionate K-fans initially learn by themselves in various ways. From Figure 5, K-fans of 30.19% are not satisfied while 24.53% are highly satisfied with their learning experience. On the other hand, 20.75% of the learners have average experience. The satisfaction ranges from 'Average' to 'Very Much' within which 65.09% (=20.75%+19.81%+24.53%) of the Bangladeshi K-fans are presenting a greater mass. Therefore, we can say Bangladeshi K-fans are quite satisfied by learning Korean in various ways. Noticeably a big mass of fan never tried systematic education like books, reading, writing etc. to master the language as Figure 6. Thus, K-fans' opinion about the effective ways of learning can be used to establish an innovative curriculum or study plan as the following sample table shows.

Table 1. Curriculum Plan based on K-fans Attitude

	K-pop	**K-drama/movie**	**Book**	**Cultural Activity**
Purposes	Lyrics or story as speaking practice.	Dialogue or Story as Text Content.	Various topics as content for Grammar and Vocabulary.	Organizing Program, Festival, Workshop, Exhibition, Occasional Event, Competition, Seminar, Conference.
Aims	1. Getting idea of changes in generations. 2. Acquiring motivation through youthfulness. 3. Introducing changes in spoken language. 4. Learning various vocabulary use. 5. Realizing communication approach.	1. Getting knowledge of social culture. 2. Broadening interests in content. 3. Reducing the understanding gap of content by video clips. 4. Enriching vocabularies of synonyms. 5. Realizing communication approach. 6. Introducing variety of social topics. 7. Introducing changes in spoken language. 8. Conceptualizing spoken vocabulary differences. 9. Introducing Korean literature.	1. Specifying structural study plan by ability. 2. Topics based on importance. 3. Practicing step by step. 4. Introducing culture and tradition. 5. Introducing Korean literature.	1. Identifying cultural differences. 2. Understanding cultural values and richness. 3. Introducing to cultural involvement. 4. Increasing adaptability in new culture. 5. Practicing core cultural beliefs. 6. Realizing communication approach. 7. Introducing history, tradition and heritage. 8. Exploring natural beauties in tourism.
Application	All types of contents are applicable for learners various proficiency level according to curriculum structure.			

	All are applicable as Speaking, Reading, Writing, Listening Practice Material based on learners' interests.

CONCLUSION

The educational background data refers a remarkable size of educated mass became biased towards Hallyu. The number of Hangul learning K-fan is increasing day by day. Cultural diversity paves the way of learning foreign languages satisfactorily. In this perspective, South Korea inherits a very amazing culture to attract language learners. Their learning interests tend to the communication as well as culture and literature studies indicating that the learning appetite among Bangladeshi youth has become changed into Korean in respect of foreign language study plan. Therefore, a new curriculum for Korean language studies is necessary that meets fans' interests to make learning more enjoyable through institutional education system.

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EFFECT OF MOLECULAR WEIGHT ON THERMAL BEHAVIOR AND PROCESSABILITY OF OLIGOMERIC PHTHALONITRILE RESINS

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Abstract

A series of phthalonitrile end-capped oligomers having controlled molecular weights were prepared by the reaction between aromatic diols, dichloro compounds and 4(4'-aminophenoxy) phthalonitrile. The average molecular weight of the oligomers can be controlled by varying the stoichiometric ratio of diols and dichloro compounds used. The structure of the prepared compounds was characterized by FT-IR and NMR spectral techniques. The average molecular weights (Mn & Mw) and polydispersity index (PDI) values of the oligomers were determined by Gel permeation chromatographic (GPC) analysis. Differential scanning calorimetric (DSC) analysis was used to follow the cure behavior of the oligomeric phthalonitrile with 4,4'-oxydianiline (ODA) curing agent mixtures. The oligomeric phthalonitriles were converted into cross-linked network structure by three step curing process at elevated temperatures. As the average molecular weight of the oligoimides increases, an enhancement of thermal stability was observed. Such oligomeric system is expected to be quite useful for the advanced composite applications that need high temperature capabilities.

Keywords: phthalonitrile oligomer, controlled molecular weight, GPC analysis, thermal properties.

1. Introduction

Currently there is a great demand for a new class of high performance composite materials which bridge the gap between organic, metal and ceramic based materials. The requirements for this new class of composite material are that it must have good processability, show good mechanical performance characteristics and long term, high service temperature capabilities [1-2]. A major advantage of phthalonitrile resins compared with other plastics is their ability to withstand temperature in excess of 200˚C for extended periods without permanent damage to the coatings, plastics or composites made [3]. Polymerization takes place through the terminal cyano group by an addition mechanism to afford cross-linked networks. These materials exhibit good thermal and oxidative stability [4-5].

The chemical and physical properties of the polymers primarily depend on the bridging groups. The aromatic moieties provide the high mechanical strength, modules. Although these polymers have flexible moieties in the linking group, the toughness of the polymers is not high because of the shortness on the bridging group [6]. Phthalonitrile monomers with short bridging chains are difficult to polymerize. The processability of the prepolymers plays a vital role in the preparation of high temperature advanced composites with enhanced mechanical properties [7].

Phthalonitrile polymers usually contain highly stable structural units such as aromatic and heterocyclic rings. Unfortunately, polymers composed solely of these high temperature structural moieties tend to brittle and intractable. Thus, the attention has been directed towards the introduction of flexible linkages into the chain together with the high temperature units [8-10]. In order to overcome the above disadvantages, a new oligomeric phthalonitrile resins as potential matrices for composite formulations has been developed. Several oligomeric phthalonitriles of varying average molecular weight in which the two terminal phthalonitrile units are interconnected by moieties with aromatic ether and sulfone linkages have been synthesized.

2. Experimental

2.1 Materials

4-nitrophthalonitrile was synthesized according to the procedure given in a previous study [5]. *N*,*N*-dimethylformamide (DMF) and toluene were purchased from SRL, India. These solvents were purified by distillation under reduced pressure over calcium hydride and stored over 4Å molecular sieves. Phthalimide, hydroquinone, 1,5-dihydroxy naphthalene, 4,4'-dichlorodiphenyl sulfone, 4,4'-dichloro benzophenone and potassium hydroxide were used as received from E-Merck, India.

2.2 Measurements

Fourier Transform Infra Red (FT-IR) spectra were recorded on a Perkin-Elmer RX-1 spectrometer using a KBr disk at a scanning range from 4000 to 400 cm^{-1}. ^{1}H-NMR and ^{13}C-NMR spectra were obtained on a Joel Ex-400 spectrometer (400MHz) using DMSO-d_6 as solvents and the chemical shifts were calibrated by using 1% TMS as a reference. Elemental analysis was carried out with a Perkin-Elmer model 2400. The viscosity measurements were performed on a TA Instruments AR-2000 Rheometer, with an environmental testing chamber for temperature control. 40 mm diameter parallel plates were used in the test chamber of the rheometer. The melt viscosity of the phthalonitrile prepolymers were monitored in air at 270°C as a function of time. The viscosity measurement was used to determine the optimum level of curing additive concentration and processing temperature. DSC analysis was performed on a Q_{10} series TA instruments Differential scanning calorimeter using 3 mg of the sample crimped in aluminium pans at a heating rate of 10°C/min and a flow rate of 40 ml/min. Thermo gravimetric data were obtained on a Q_{100} series TA instruments in flowing Nitrogen/air at a heating rate of 20°C/min.

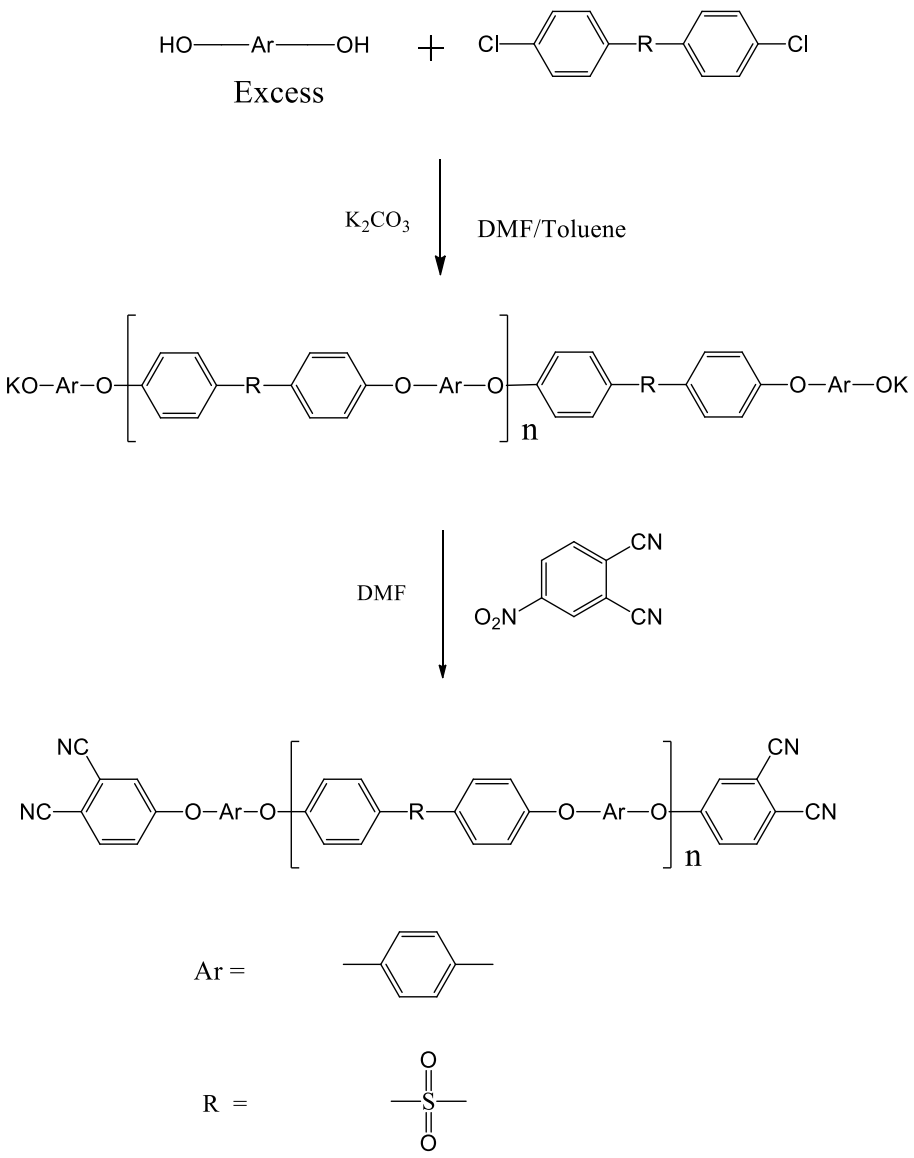
2.3 Synthesis of oligomeric phthalonitriles

To a 250 mL, three-necked flask equipped with a thermometer and Dean-Stark trap with a condenser, and a nitrogen inlet was charged 4.4g of (0.04 mol) hydroquinone, 5.8g (0.02mol) of 4, 4'-dichlorodiphenyl sulfone and 50 ml of dimethylformamide. While stirring to dissolve the two reactants, the solution was purged with dry nitrogen for 30 minutes and the Dean-Stark trap was filled with toluene. 8.28g (0.6mol) of andydrous potassium carbonate was then added. The temperature of the reaction mixture was increased to 100˚C and held at this temperature for 1 hour. The mixture was then refluxed at 135-145˚C under nitrogen atmosphere for 12 hour or until no more water was observed being collected in the Dean-Stark trap. FT-IR spectroscopy was used to confirm and monitor the formation of the desired oligomeric product. After the toluene was removed by distillation, the reaction mixture was cooled to room temperature, and 6.92g (0.04mol) of 4-nitrophthalonitrile was added in one portion. The resulting mixture was stirred at 80˚C for 6 hour. The mixture was allowed to cool to the ambient temperature and poured into a 5% aqueous KOH solution. A solid product was collected by suction filtration, washed with water, and dried to afford 9.8g. All the other oligomers were prepared by varying the stoichiometric ration of reactants.

FT-IR (A1) (KBr pellet, cm^{-1}): 2233 (C≡N), 1256 (C-O), 1110 (C-O); ^{1}H NMR (300MHz, DMSO-d_6) δ (ppm): 7.39-7.54 (m), 7.55-7.68 (m), 7.70-7.95 (m), 6.72-6.90 (m), 7.10-7.38 (m), 8.10-8.32 (m)

2.4. Synthesis of prepolymers

The synthesized oligomeric phthalonitriles were washed with 5% sodiumhydroxide solution to remove insoluble impurities, dried in a vacuum oven at 80˚C for about 10 hours. A reaction kettle added 25 g of phthalonitrile monomer (A1) and heated at 245-255˚C in air atmosphere for about 5 minutes. Then added 4.0wt % of curing agent 4, 4'-diaminodiphenyl sulfone (DDS) in one portion and stirred well for another 5-10 minutes. After homogeneity occurs, the product was quenched to room temperature. A dark color amorphous solid prepolymer product was obtained. It has the solubility in common organic solvents such as methylene chloride, chloroform, *N*,*N*-dimethylformamide (DMF), *N*,*N*-dimethylacetamide (DMAc), and 1-methyl- 2-pyrrolidinone (NMP).



Scheme 1. Synthesis of phthalonitrile oligomer

2.5 Polymerization of perpolymers

All prepared oligomeric prepolymers were converted into crosslinked networks by three step thermal curing process based on the results obtained from DSC cure analysis. 10 g of each of the prepolymers were weighed in a reaction kettle and polymerized in air atmosphere. The samples were cured at 250°C for 5 hours, 260°C for 5 hours and 280°C for 8 hours. Finally, the samples were post-cured at 300°C for about 10 hours.

3. Results and Discussion

3.1 Syntheses of phthalonitrile oligomers

A series of oligomeric phthalonitriles (A1-A3), in which the average molecular weights were varied by reacting different mole ratios of (excess) of dialkali salt of aromatic dihydroxy compounds with dichloro compounds followed by endcapping with 4-nitrophthalonitrile were synthesized. The synthesis was performed by mixing the reactants together in one reaction vessel. The reaction was carried out by in situ one-pot, two-step method. The average chain length of the oligomeric linkage between the terminal phthalonitrile units depends on the molar ratio of the reactants used.

In the first step, the diphenols were converted into alkali phenolate by the reaction with potassium carbonate in polar aprotic solvent, *N*,*N*-dimethylformamide. Toluene was added for removing water by azeotropic distillation. The reaction was performed in nitrogen atmosphere. In the second step, dichloro compound was added to the diphenolate (excess) in a specific mole ratio. The reaction mixture was refluxed at about 155-165˚C for about 13 hrs. The water formed as by-product was removed by azeotropic distillation. When the reaction is complete (no more water gets collected), toluene was removed from the reaction mixture by distillation and the reaction mixture was cooled to room temperature.

The last step consists of adding 4-nitrophthalonitrile to the dipotassium salt of bisphenol, resulting in the formation of ether linkages connecting oligomeric phthalonitriles. The phthalonitrile end-capped product was obtained by the displacement of the nitro group by the phenolate in the presence of potassium carbonate. The reaction mixture was then poured into 5% potassium hydroxide solution and the phthalonitrile endcapped oligomer was separated by vacuum filtration. The oligomeric phthalonitriles with different molecular weights were prepared by varying the mole ratio (1.5-2.5) of reactants. The synthetic scheme provides a versatile method for obtaining a wide array of phthalonitrile oligomers of varying average molecular weight. By increasing the distance between the terminal phthalonitrile moieties and by incorporating flexibility into the interconnecting unit by means of the ether linkages, the toughness of the corresponding polymers should be enhanced. In addition, the cross-linking density of the polymers can be readily controlled as a function of the molar ratios of the reactants used in the synthesis. All the oligomer samples were obtained in good yield and were found to have low melting points comparably with phthalonitrile monomers [11-12].

3.2 FT-IR Analysis

The representative infrared spectrum of the oligomer (A1) shown in Figure 1. The absorptions around 2230-2233 cm^{-1} correspond to the stretching vibration of terminal

nitrile (C≡N) group. The absorption band around 1039-104 cm^{-1} is due to the sulphoxide linkages. The asymmetric and symmetric stretching vibration of C-O-C were observed around 1241-1252 and 1080-1092 cm^{-1} respectively and absence of band around 3300-3500 cm^{-1} due to OH group confirms the completion of reaction. In addition, decrease of intensity of the nitrile absorption was observed for all the oligomers relative to the other characteristic absorptions. This may be attributed to the enhancement of molecular weight, which leads to the increase of interconnecting chain length [13-14].

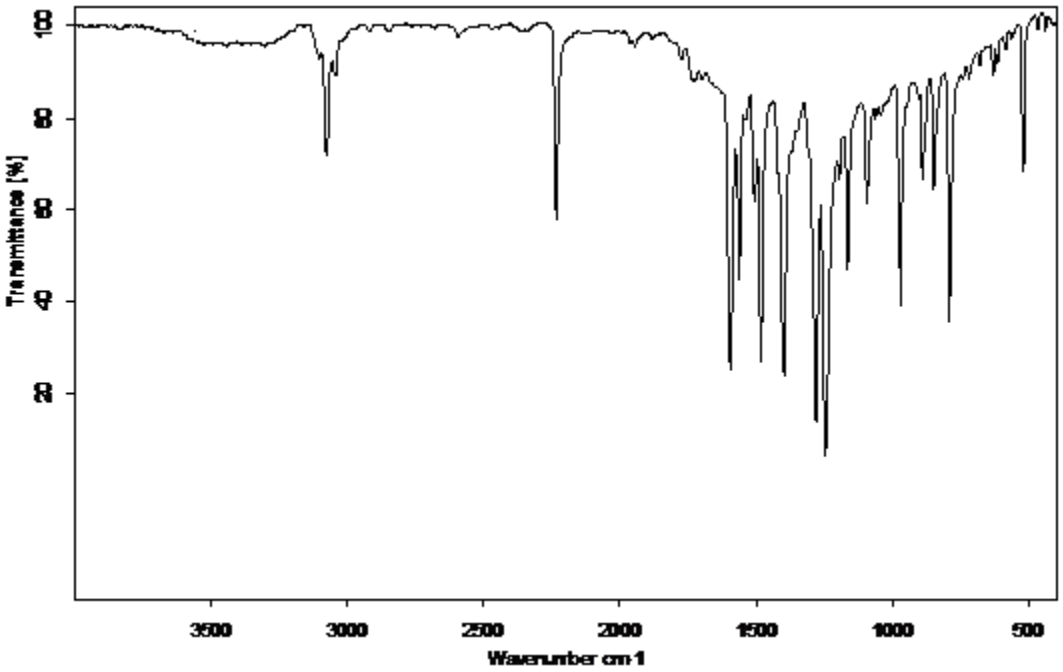


Figure 1. FT-IR spectrum of oligomeric phthalonitrile (AI)

3.3 ^{1}H NMR spectral analysis of oligomers

^{1}H NMR spectroscopy was used to confirm the structure of the oligomeric phthalonitriles. The representative ^{1}H NMR spectra of the oligomers are shown in Figure 2. All the proton signals were observed in the aromatic region in the range of 6.72-8.32 ppm [1]. This result shows that the formation of oligomeric phthalonitriles. All the proton signals are broad and multiplets, which confirms the presence of dimer and oligomeric species in the synthesized product [5].

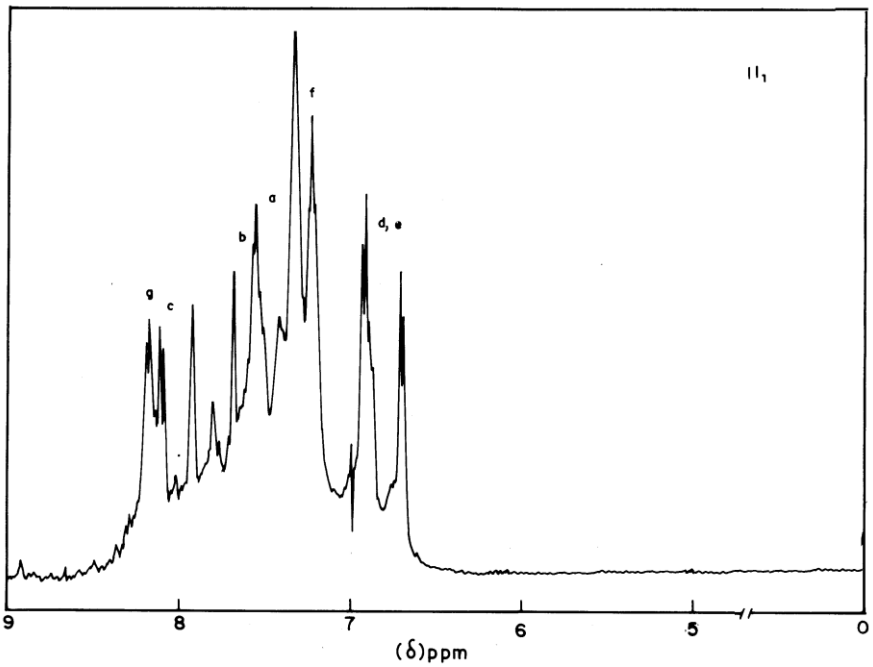
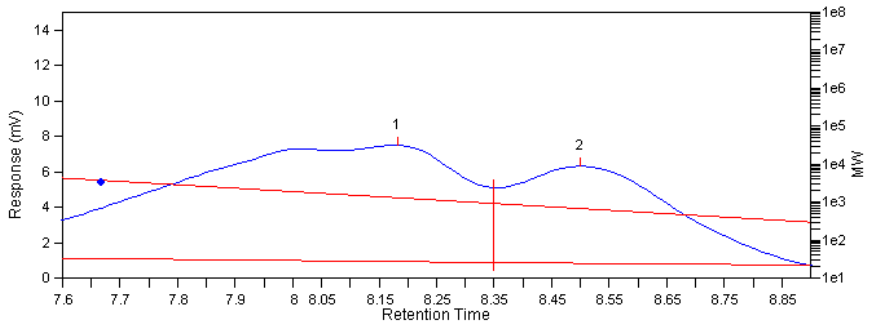


Figure 2. ^{1}H NMR spectrum of oligomeric phthalonitrile (AI)

3.4 Molecular weight Distribution (GPC analysis)

The average molecular weights and molecular weight distributions of the phthalonitrile oligomers were determined by GPC analysis in THF as solvent. It was observed that the average molecular weights are enhanced with increases of mole ratio of the individual reactants.



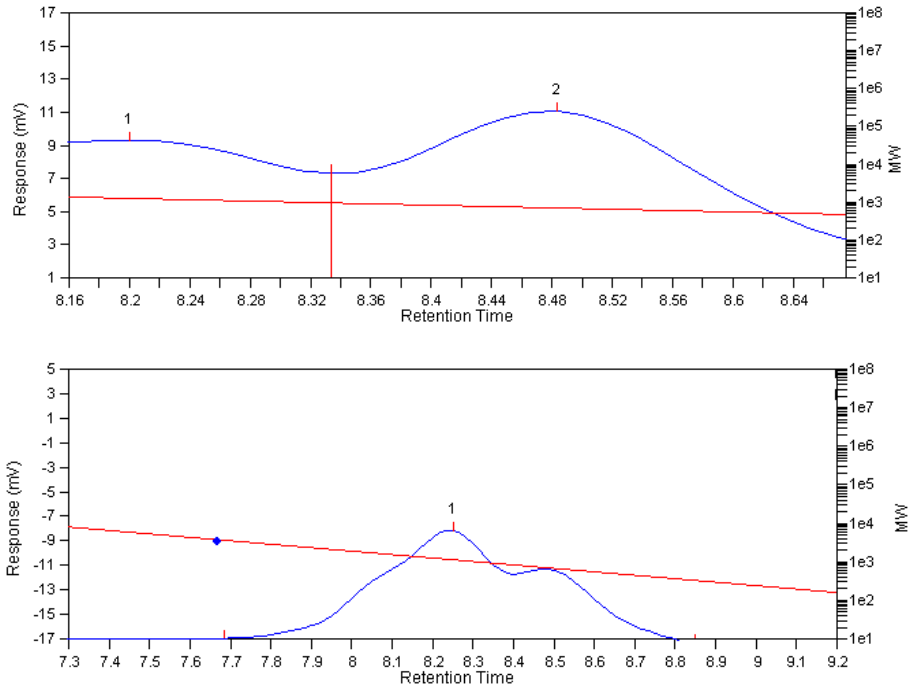


Figure 3. GPC molecular weight distribution of oligomers A1, A2 and A3

Code	Dichloro/ dihydroxy ratio (mol)	Molecular weight (g mol^{-1})			Repeating units (~n)
		Mn	Mw	Mp	
A1	1: 1.5	1775	2230	1298	3.5
A2	1: 2.0	1541	1877	1171	3
A3	1: 2.5	1041	1219	1232	2

Table.1 GPC average molecular weight analysis results

3.5 Cure behavior (DSC studies)

The cure behavior of oligomeric phthalonitriles was studied by differential scanning calorimetric technique and the results are given in Table 2. The DSC thermograms of oligomers (A1-A3) with 5 wt% of ODA (curing agent) are shown in Figure 3. The DSC thermograms exhibit a melting transition around 172-196˚C. The cure exotherm was

initiated (T_i) around 242-265˚C, the maximum cure (T_{max}) was observed around 268-279˚C and the cure reaction was completed (T_{end}) around 288-306˚C. The DSC cure studies reveal that the oligomeric phthalonitriles were cured at fairly lower temperatures upto n=~4 relative to the phthalonitrile monomers. In addition, the oligomers were cured in comparatively short periods. The reason may be due to the incorporation of multiple ether groups which leads to flexibility and thus the chain mobility enhanced. Moreover, these oligomeric phthalonitriles show large processing window (~80-90˚C) which can be easily processed as composite components with enhanced toughness [15-16].

3.6 Polymerization

The neat curing of phthalonitrile resins has been shown to proceed very slowly even during extended periods of time at elevated temperatures. The phthalonitrile monomers thus converted into amorphous prepolymers at a curing rate dependant upon both the amount of curing additive and the curing temperatures. The samples were cured at 245 ˚C for 5 hrs, 280 ˚C for 5 hrs, 300 ˚C for 5 hrs and post-cured at 340 ˚C for 5 hrs, respectively.

3.7 Thermal properties

The thermal stability of the oligomeric cured resins were evaluated by TGA analysis at a heating rate of 20˚C/min in nitrogen atmosphere. The temperature at 5, 10% weight loss and residual weight retention at 800˚C are summarized in Table 2. The representative TGA thermogram of the oligomeric phthalonitrile resins are shown in Figure 4. The polymers did not show any considerable weight loss upto 450˚C. The temperature at 5 and 10% weight loss are in the range of 456-469 and 471-512˚C respectively. The results shows that thermal stability increases with enhancement of molecular weight (n= ~4). The stability can be attributed to the fact that, upon curing, the cyano groups of the phthalonitrile react to form triazine ring structures. The formation of heterocyclic ring structures promotes high thermal stability, as well as good mechanical properties [17-18].

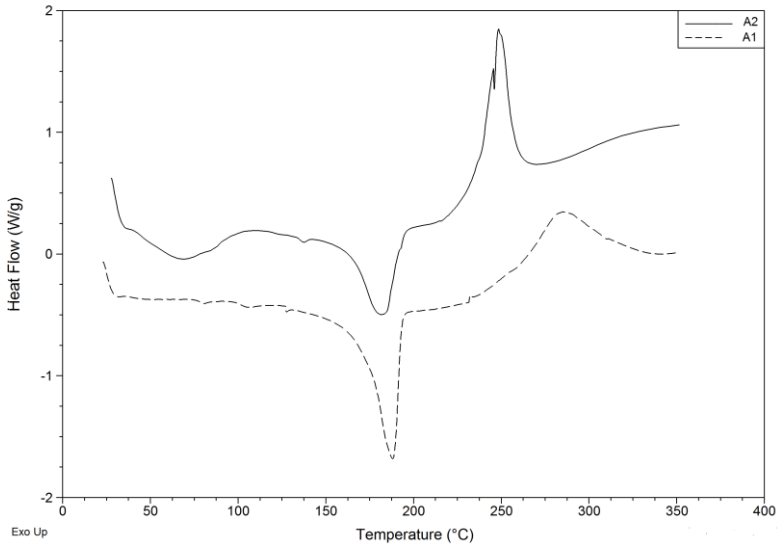


Figure. 3 DSC cure profile of oligomeric prepolymer A1 and A2

Oligomer code	DSC cure temp (˚C)			TGA		
	Initial (T_i)	Maximum (T_{max})	End (T_{end})	$T_{5\%}$ (˚C)	$T_{10\%}$ (˚C)	Char yield (%)
A1	247	268	288	456	471	58.3
A2	251	274	293	462	488	55.1
A3	254	274	299	467	504	56.2

Table.2 DSC and TGA analysis results

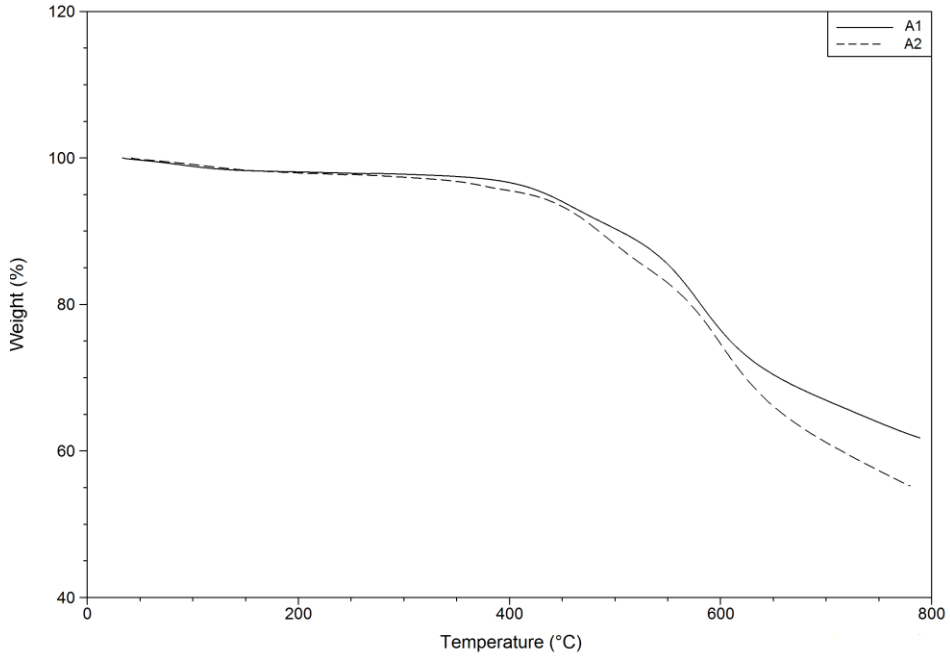


Figure. 3 TGA analysis of oligomeric cured resin A1 and A2

4. Conclusions

Oligomeric phthalonitriles bearing multiple aromatic ether linkages with various average molecular weights were prepared from the reaction of diols, hydroquinone, 1,5-dihydroxy naphthalene and dihalides 4,4'-dichlorodiphenyl sulfone, 4,4'-dichloro benzophenone, and 4-nitrophthalonitrile. The average molecular weights of the oligomeric phthalonitriles were determined by GPC analysis in DMF as eluent. The number average molecular

weight (Mn) and weight average molecular weight (M_w) are in the range of 2042-4103 and 2480-4973 respectively. The prepared oligomers were comparatively low melting and easily processable as thermosetting composite materials. In addition, these materials are expected to be enhanced flexibility and other mechanical properties.

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REMOTE TEACHING AMIDST COVID19 IN INDIA: APPROACH, CHALLENGES & LEARNING

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Abstract

The lockdown imposed in India on 25 March 2020 resulted in the indefinite closure of education institutes all across the country. The government and educational institutes were quick to respond, they shifted teaching from offline to online mode. This article aims to identify the approaches made by the higher education institution for continues imparting of education amidst lockdown. The article also identifies the challenges faced by teachers in Remote Teaching from their homes. The study is descriptive and analytical in nature and data has been collected from secondary sources like reports, news articles, blogs, interview videos, magazines, social media, and journals to achieve the objective of the paper. Based on the secondary sources' information, the article also advocates the learning curve for the future to deal with any such crisis impact on the education system of India. The findings revealed that higher education institution have taken many initiatives in this pandemic situation for imparting education. But these initiatives have not been very successful from the teacher's perspective. Teachers faced may issue in Remote Teaching such as lack of technical facilities, family interruption, lack of training, lack of clarity & direction, lack of technical knowledge. The learning curve of the article facilitates the higher education institution to help them to execute the online educative in an effective manner.

Keywords: Remote Teaching, Teaching approach, Challenges, COVID-19; Higher Education institutions; Teachers, Lockdown

INTRODUCTION

COVID-19 pandemic has ushered a new dimension to the education system in India. Many higher education systems have adopted or are in the process of adopting Remote Teaching during the on-going crisis. Teachers were expected to adopt technology as a tool to teach students in order to provide a temporary arrangement instead of face to face interaction (Hodges, et al., 2020). The paradigm shift of taking classes in conventional classrooms to taking classes at the convenience of the home has introduced hope and belief but has also raised doubts and apprehensions (Microsoft, 2020). Under the given circumstances it is evident that teachers of Higher Education Institutes have to change their pedagogy following the simple philosophy of progress or perish. It is also clear that Remote Teaching in India is not a short-run phenomenon and is here to stay for the long term. The lockout of education institutes has also exposed them to how well they were prepared to teach other than the classrooms. With untrained teachers to teach using an online system that they were not familiar with, the education may have suffered. Though the government and UGC claim to run classes online without having any adverse impact on academics but a lot more introspection is required in this regard. Due to a lack of training and understanding, teachers may face a lot of problems in adopting technology for teaching (Wadke, 2020). It is important to note that Remote Teaching can't be successful without the support of teachers, as they are the frontline workers of any educational institution. COVID-19 epidemic has made

it mandatory for teachers to use online platforms for teaching to support the education sectors. The teacher needs to adapt the technology for the successful execution of Remote Teaching and assessments. The article explores the measures adopted by the government and higher education institutes to continue the education and not letting the academics suffer. The article also tries to bring out the challenges faced in imparting education through different online tools, thereby substantiating the overall impact on the education system of India.

APPROACH

In Education, institutes are an amalgamation of students and teachers from all over the world, which makes it more vulnerable during the COVID19 pandemic as the risk of spread of disease becomes multi-folded. So the government has announced the lockdown and closure of educational institutions as a logical solution. It was assumed and predicted that the lockdown will soon be over and classes will restore but as the lockdown being extended till 17th May 2020 and the number of cases continuously escalating it is assumed that the institutes will not follow the conventional method of teaching till October 2020. India being highly populated country and is over-dependent on the service sector, it cannot afford to cancel a semester or academic year. Considering the depth of the situation, the Government along with educational institutes have started to look for solutions so as not to disrupt the academics.it was unanimously agreed to deliver education through the online system (Saxena, 2020). University grant commission issued its guidelines pertaining to academics on April 29, 2020. They suggested delaying the session for the academic year 2020-2021 to August 1, 2020 and advised higher institutions to conduct classes through online learning/social media (WhatsApp/ youtube)/ SWAYAMPRABHA channels/video conferencing/ mobile apps/ emails. The higher education institutions response directed their teachers to conduct the classes from their home using a different online learning system .COVID-19 converted teaching from a conventional model to EdTech Model, where both teachers and students are exposed to new innovative educational technology. Many higher education institutions (HEIs) commenced distance education and online learning during the COVID-19 pandemic. Renowned HEIs such as the Institute of Technology (IITs), Indian Institutes of Management (IIMs), ICFAI University, Jawaharlal Nehru University, Symbiosis International University Netaji Subhas University of Technology, IGNOU, Jamia Millia Islamia, and Delhi University, etc. are offering online classes to its students. A week-long campaign 'bharat padhe online' was launched by the government of India on April 10, 2020 to improve the online transfer of knowledge. Many initiatives have been taken to kick-start the education covering all the aspects, some of them are SWAYAM online courses for teachers to increase their knowledge and efficiency, e-PG Pathshala covering social science, arts, UG/PG MOOCs for non-technology courses, natural and mathematical science, CEC-UGC YouTube channel, Vidwan-a database of experts who provide information to peers and potential collaborators, NEAT-an initiative by AICTE to imbibe the required skills in the students' (Nanda, 2020). The government has created the infrastructure to deliver e-education, these include national knowledge network(NKN) to provide high-speed network as a backbone to educational institutes, a national project on technology-enhanced learning, national mission on education through information and communication technology, national academic depository (Sharma, 2020).At present all teachers are busy using different ways to engage the students some are using digital learning portal, some are recording videos and sharing on WhatsApp or mailing them, some are taking lectures through learning management systems, some are busy sending assignments and projects. The whole scenario has created a unified approach and projects that lockdown was not able to restrict the academics in India. Emergency remote teaching should work with various shareholders to provide better and timely solutions and should be concerned, it is also necessary to care for and help the learners during COVID times (Bozkurt & Sharma, 2020).

CHALLENGES

Considering the present situation, though internet-based teaching and learning is the only appropriate stop-gap procedure in India, they need to realize that only a few institutes of higher education are using the Learning management system (Gulzar, & Leema, 2016). Learning from a distance is not as effective as face to face interaction, the sufferers are the students who are not well versed with the subject. Teachers offering their services in Higher education are not well trained to teach online. Most of the teachers still are digital migrants that are born after the 19th century. They are facing many problems while transforming knowledge from their home. The lockdown has imposed different kinds of problems primarily rising due to change in the teaching environment settings. Teachers may not have sufficient infrastructure like a laptop, internet, microphones, etc. to efficiently impart education. If teachers, while conducting sessions face any technical difficulty, technical assistance is not available. Continuous distractions from family members have an adverse impact on teaching.

Most of the HEIs in India are not well equipped with technologies such as Moodle, Blackboard (teaching app), Microsoft Teams, and Zoom, but they have made it mandatory for teachers to utilize open-source Remote Teaching platforms such as WhatsApp, YouTube, Skype, Google hangout, etc. Ela Goyal, who has a Ph.D. in the use of technology in education, is an alumnus of St Stephens College and former professor in a management school, is running independent workshops to train the teachers. "Many of them are not aware of how to conduct remote classes; most of them are from socially and economically underprivileged backgrounds and are not aware of such tools." (Agha, 2020). Remote Teaching is being engaged in an unproven and extraordinary proportion. A conventional classroom consists of chairs, tables, board, marker, and projector. None of these facilities are present in the home environment settings as a result of teachers may not be able to do justice to the lessons taught. External distractions due to a noise coming from the neighbourhood or the family members may pay an adverse impact on the continuity of sessions (Press Trust of India, 2020).

The teachers are expected to teach online without any proper training. The lockdown caught the teachers unaware and unprepared. They face technical issues connectivity, system failure, bandwidth issues, etc. to conduct online sessions one should have the good technical infrastructure but very few teachers may have the latest configured laptops, microphones, and camera. A survey conducted by QS I Gauge, which rates colleges and universities in India with complete operational control held by London-based QS pointed out that “the infrastructure in terms of technology in India has not achieved a state of quality to ensure sound delivery of online classes to students across the country” (Agarwal, 2020). Teachers are accustomed to the orthodox method of teaching. It will be an injustice to expect them to transform within a month. Institutions are using PowerPoint presentations, recording video lectures, taking online classes through different apps, but they do not offer any clear instructions as to how this should be done. They expect an aged teacher neither technically sound to do Remote Teaching "(Sharma, 2020.). External pressure from the institute may generate negative attitude in teachers as they will teach only by force not out of pleasure. The importance of classroom learning is undeniable and this pandemic proves that India is not yet ready to handle online classrooms (Mahesh, 2020). It is also difficult to teach some of the courses which require personal interaction like numerical, experimental, communication subjects. Teachers may face pedagogical issues in imparting education online as the students are a heterogeneous group and many students face language barriers especially English, which makes the online material shared by the teachers inaccessible. However during face-to-face teaching, language factors are mitigated as teachers use bilingual communication (Mahajan, 2020). It is expected that teachers may not be motivated to teach due to many factors such as lack of interaction, lack of student

engagement, psychological and emotional need cannot be ascertained, unable to reach students, indiscipline, and inability to effectively clear student's doubts. With remote learning Lack of interaction and feeling lonely is also a major concern. Both the teacher and the learner are not as motivated as they would have been during regular sessions. The teachers are under pressure to keep themselves motivated and at the same time engage the students as well. (Bozkurt, et al., 2020) highlights the issues that should be taken into consideration such as using alternative assessment and evaluation methods and should be concerned about surveillance, ethics, and data privacy while using online solutions.

CONCLUSION

COVID19 pandemic has ushered the education system into a tech-savvy path (Govindarajan & Srivastava, 2020). Though it is evident that online classes and assessments cannot substitute conventional mode of teaching but the role of technology and its extensive use in imparting education cannot be neglected. The government and all higher education institutes have done their best for the smooth flow of education. Though the methods being adopted are based on trial and error, but it is to be noted that continuous efforts are being implemented. Government, institutes, teachers are daily coming up with guidelines, pedagogy and methods to implement efficient Remote Teaching. It may seem that classes are being run smoothly and the academics will not be disturbed, but the problem is deep-rooted. The education system stands tall on two pillars, teacher and student. The Remote Teaching is just a procedure supported by the government and institutes. The complete responsibility of its effective implementation rests on teachers, the majority of which are not trained and lack resources. All may feel good about it as students are happy as it will be easy for them to progress to next semester class, teachers are not going to complain as they have to secure their job and institutes will always claim that they are one in the league, but somewhere efficiency may be compromised.

LEARNING CURVE

Every dark cloud comes with a silver lining, the lockdown has disturbed the education sector but we have an option which will open a new course for the Indian Higher Education. All higher education institutes now are aware of the importance of technology and should take serious measures to conduct technology-driven sessions and incorporate attendance, delivery, assignments, examinations, assessments, and results through the learning management system. Higher education institution needs to introduce a new course structure and focus on courses that will be taught online using flipped classrooms and blended learning. Every university and college should have a dedicated department for technical support and imparts training to teachers and staff. Financial support to teachers like interest-free loans to teachers to buy updated laptops, cameras, microphones, etc. so that teachers are well equipped even at home to take sessions. A collaboration of Government, technology companies, and Higher education institutes in the mode of PPHP (Public, Private Companies, Higher Education Institutes Partnership) can solve the problem of technical infrastructure. Effective Remote Teaching will create digital literacy and with less cost on facilities will make higher education affordable, thus generating a pathway for new India.

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COMPARISION OF IMAGE DENOISING USING WAVELET TRANSFORM AND WAVELET PACKET TRANSFORM

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Abstract

In today's modern world, science and technology plays an important role in making our lives faster, better and more fun. In this technological world, visual information transferred in the form of images. Image plays an important role in our social and economic life. As the received image consist noises they should have to be processed before using it for applications. Different denoising techniques are introduced to remove noise from an image like wavelet transform, wavelet packet transform and so on. In this paper we provide that wavelet packet transform is a much better technique than wavelet transform for denoising an image.

Keywords: Image denoising, Wavelet Transform, Wavelet Packets and Wavelet Packet Transform.

INTRODUCTION

Science and technology in today's world have an important role to play in enhancing and improving our lifestlye. Visual knowledge in the form of photographs is conveyed in this technical environment. Image denoising is one of the standard digitization problems and has been studied in various electronic imaging applications for almost a half hundred years due to their significant role as a pre-processing process. The search for efficient methods to denoise images remains a valid challenge. Although the newly proposed methods are sophisticated, most algorithms still have not achieved a desired level of applicability. Both demonstrate outstanding results when the models conform to the expectations of the algorithm but usually struggle and delete fine image structures or generate artifacts.

There is no modern understanding of wavelets. The idea for a superposition of functions had existed since the beginning of 1800. When Joseph Fourier1discovered that he could superimpose the functions of sine and cosine, as well as his frequency analysis theories, now known as Fourier 's synthesis, it started to exist in 1807[17]. Although the Fourier transform was important part of the transformed signal process in the late 1950s, there were major gains in the fields of deroulation, compression and classification, a more recent transformation known as the wavelet transformation.

Wavelets were first mentioned in 1909 in the doctoral thesis of A. Haar [12],which is now known as Haar wavelets family. By using the Haar basis function, Paul Levy a physicist found a type of radiation signal called Brownian motion in 1930's [9]. By 1980's two researchers Grossman and Morlet a physicist and an engineer provides a way for thinking about wavelets based on physical intuition and also defined wavelets in the context of quantum physics [23].

In 1985 Stephane Mallet made a further breakthrough with his work in dig-ital signal processing. The relations between orthonormal wavelet bases of the pyramidal algorithm are pheasant. Out of that the first non-trivial wavelet was built by Y. Meyer. Daubechies is considered as the backbone of today's wavelet applications.

Wavelet packets can be regarded as an idea with general application, which can produce the arbitrary resolution of wavelet tree decomposition. In 1992 coifman and Wickerhauser introduced the mathematical work on the wavelet packet[5].

The most modern scientists are aiming at creation and transforming a set of basic functions into what gives an informative, effective and helpful described function or signal. The work of Donoho, Johnstone and Coifman[6] has also shown why wavelet analysis is so versatile and powerful and generalization has been carried out still further. They showed that exceptional wavelet systems are developed by adaptive means for particular signals and signal classes. They also have certain inherent general advantages and are ideal for a broad range of difficulties.

In this paper, we summarize the concepts of wavelet theory in Section 2 as for image denoising prospects and in section 3, we summarize the concepts of image processing concepts. In section 4, we provided block diagram of image denoinsing using wavelet transfrom and wavelet packet transfrom and also provided the experimental results. Further, we provided comparative study of image denoising using wavelet transfrom and wavelet packet transfrom and shown that wavelet packet transform provides better results than wavelet transform.

WAVELETS

As a mathematical function wavelets are localized functions which are very useful tool in many applications: cutup data, signals or images into different frequency components or for the compression of images and digital signal. They analyse each frequency components with a resolution matched to its scale. The main feature of wavelets is their natural splitting of objects into diverse scale components. It is a basis function that can be isolated with frequency. It has some time domain and some frequency domain. It makes it possible to construct an analysing function by translation in time and dilation in scale.

Time domain has only full time resolution and frequency domain has only full frequency resolution whereas wavelet domain has both time and frequency resolution. Examples of wavelets: Haar wavelet, Shannon wavelet, Journ´e wavelet, Doubechies wavelet.

WAVELET TRANSFORM

The wavelet transform is capable of providing information regarding time and the frequency simultaneously, that is, giving a time frequency representation of a signal. Most of the researchers prefer wavelet transform instead of other transforms, like Short Time Fourier Transform, because it gives a constant resolution at all times, whereas Wavelet transform gives variable resolutions: high frequency resolution at low frequencies and high time resolution at high frequencies.

Usually noises occurs in image by different ways and is not easy to remove. Many method and techniques have been developed to overcome noise in an image. Among this wavelet transform is the most useful one. The invention of wavelet transforms by the late 1980s has led to many changes and progress in the field of image denoising.

The Continuous Wavelet Transform compares a signal with shifted and scaled (stretched or shrunked) copies of a basic wavelet. This transform is the sum of the signal over time multiplied by the wavelet

functions in a scaled and shifted version. It allows us to fully display a signal by continuously changing translation and scale parameters. It provides us with a time frequency of a signal which provides very good location of time and frequency. The mathematical representation of continuous wavelet transform is:

$$D(q,p) = \int_{-\infty}^{\infty} m(s)\, \psi(q,p)(s)\, z(s)$$

and

$$\psi(q,p) = \frac{1}{\sqrt{q}}\, \psi\left(\frac{s-p}{q}\right)$$

here, q=scale, p=shift or translation, m(s)=signal in time domain, D(p,q)= wavelet coefficients, ψ is a continuous function both in the time domain and frequency domain (mother wavelet).

The Discrete Wavelet Transform is the basic method in many areas of analysis for discrete signals and image processing. It offers information on the frequency and location of the analyzed signal, a key advantage of time resolution over other transformations. The discrete transformation of the wavelets effectively breaks down a signal into a sequence of mutually orthogonal wavelet bases. The mathematical representation of discrete fourier transform is,

$$DWT\ (g)(m,n) = |a_0|^{j/2} \int_{-\infty}^{\infty} f(x)\, \psi(a_0^j x - k b_0)\, dx$$

Where, $a_0, b_0 \epsilon\ \mathbb{R}$, $a_0 \neq 0$, $j,k\ \epsilon\ \mathbb{Z}$

WAVELET PACKET TRANSFORM

"Wavelet packets" are the linear combination of wavelets or in other words Wavelet packet transform is a subset of wavelet transform. The discrete-time signal is allowed to pass through more and more filters than discrete wavelet transform in wavelet packet transform. In the 1990s, Coifman and Wickerhauser first proposed wavelet packets. The discrete wavelet transform provides time-frequency localization. It doesn't provide any information in the high-frequency region with low resolution or images with smaller scale wavelet coefficients. This problem leads to difficulty in differentiating high frequency transient components. This problem causes difficulties in differentiating transient components of high frequency. In order to overcome this problem wavelet packet transform can be used. It decomposes and gives the complete information of the signal on the high-frequency region or at each level.

NOISES

During transmission or acquisition an image or a signal will be corrupted by various factors which effects as noises. Noises in images are unavoidable. The performance of visuals and computerized analysis can be decreased by these noisy effects. Some other factors which allow noise to enter in a data or signal are imperfect instruments, material unexpected interfering of natural phenomena, or during the time of storage. Some common noises encountered in images are: Impulse noise, Gaussian Noise, Speckle Noise, Poisson Noise. The images captured on mobile cameras or by digital cameras will get noise from different sources.

Salt and Pepper Noise

"Salt and Pepper" noise is commonly known as impulse noise. This noise form is most frequently seen in digital imagery and happens as imagery are sent and received. They are always independent. For a Salt and Pepper noise the entire image pixels are not noisy, distribution affects only some pixels and the remaining pixels will be noise free. In salt and pepper noise the noisy pixels look like as black and white spots in images. It has only 2 values. The noisy pixel either takes salt value 225or pepper noise 0. In random value, noise can take any value from 0 to 225. In both cases the noisy pixels are randomly distributed over the image.

Gaussian Noise

Digital images also cause Gaussian noise when acquired. This type of noise generally disturbs the grey value in digital images. Statistical noise is equal to normal distribution with a probability distribution function. If Gaussian Noise is applied to each section of the image a certain amount of noise is introduced and every pixel from their original image is modified. Gaussian probability density function is,

$$F_G(w) = \frac{1}{\sqrt{2\pi\sigma}}\ e^{-\frac{(x-\mu)\hat{}2}{2\sigma\hat{}2}}$$

where, σ=standard deviation ,x=grey level , μ=mean value.

PSNR and MSE

"**Mean Square Error**" (MSE) is the average error square. Error differentiates the desired picture from the estimated picture. It enables the best estimator to be chosen and is good image quality measurement statistical method. It is ideal to have a zero (0) mid square error. If the MSE value is lower, errors are less. The MSE formula is the following:

$$MSE = \frac{1}{R \times T}\ \sum_{R,T}[f(o,p) - g(o,p)]$$

where, f(o,p) is initial image, g(o,p) is denoised image, and R and T are number of rows and columns.

The "**Peak Signal-to-Noise**" (PSNR) ratio is defined as a ratio of maximum possible signal strength and distorted noise power. PSNR is typically articulated in decibel scale of logarithmic function. To measure the quality of reconstructed image from original image, PSNR is widely used tool. The PSNR value will change by noise, in other words if the PSNR value decreases. PSNR is measured in decibels numbers. If the value of the PSNR is higher, the picture denotes better quality. The following is the PSNR calculation of the peak error:

$$PSNR = 10\log_{10}\left(\frac{r^2}{MSE}\right) = 20\log_{20}\left(\frac{r}{MSE}\right)$$

where, r is the highest number of pixels in input image.

Since the PSNR equation uses MSE only when there is less error, the PSNR equation will only be high. The PSNR is the most used benchmark measure that best evaluates any denotation system.

Block Diagram

The block diagram, that is, the basic layout of denoising an image in wavelets theory is shown below:

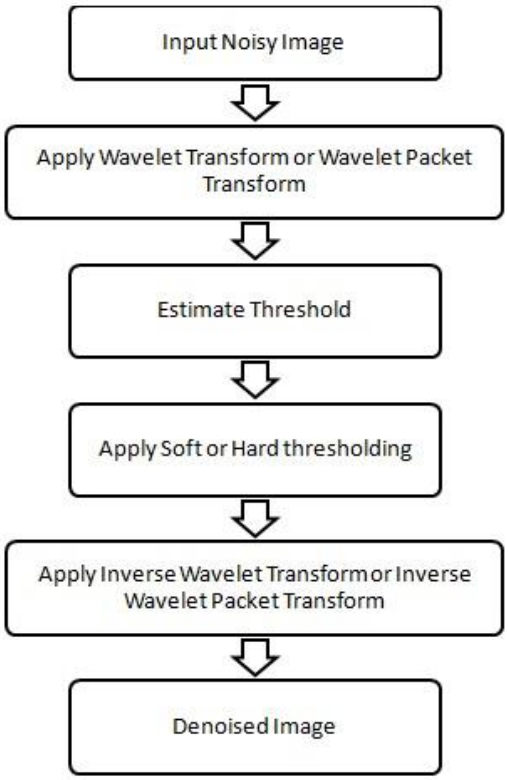

Fig. 1: Block diagram.

EXPERIMENTS AND RESULTS

For comparing Wavelet transform and Wavelet Packet transform we took an image and denoise it. An image is denoised using Wavelet transform and wavelet packet transform, separately. Firstly, the Salt and Pepper noise has been applied to the image and the PSNR and MSE values have been calculated. Then, taking the same thresholding value and thresholding method, eight different wavelet families (e.g. Haar, Daubechies, Coiflet, Shannon wavelets,etc.) has been applied to the image. Lastly, the image is denoised and the PSNR and MSE values are noted as shown below.

Original Image	Noised Image
	 MSE = 787.4387 PSNR(dB) = 19.1686

Wavelet Used In Image Denoising	Denoised Image (Wavelet 2 D Transform)	MSE and PSNR(dB) values	Denoised Image (Wavelet Packet Transform)	MSE And PSNR(dB) Values
Haar		MSE= 656.4787 PSNR= 19.9586		MSE= 297.6703 PSNR= 23.3934
Daubechies		MSE= 730.6339 PSNR= 19.4938		MSE= 290.4749 PSNR= 23.4997
Symmlet		MSE= 656.0351 PSNR= 19.9615		MSE= 315.7898 PSNR= 23.1368
Coiflet		MSE= 765.9151 PSNR= 19.2890		MSE= 448.4014 PSNR= 21.6141
Bior Splines		MSE= 770.8311 PSNR= 19.2612		MSE= 636.5526 PSNR= 20.092
Reverse Bior		MSE= 714.3822 PSNR= 19.5915		MSE= 278.3106 PSNR= 23.6855
DMeyer		MSE= 737.0592 PSNR= 19.4558		MSE= 414.1853 PSNR= 21.9589
Fejer Korovkin		MSE= 771.5407 PSNR= 19.2572		MSE= 755.0627 PSNR= 19.3510

Fig. 2: Comparison of image denoising using wavelet transform and wavelet packet transforms on the basis of MSE and PSNR of each experimental image.

CONCLUSION

This paper is about the comparison of image denoising using wavelet transform and wavelet packet transform. The experimental results show that the wavelet packet transform is better than the wavelet transform for denoising an image. Salt and Pepper noise of the same value has been applied to the image and then undergone image denoising techniques using Matlab. On the basis of, PSNR and MSE values noted in the above table, it became evident that Wavelet packet Transform is much better than Wavelet Transform for denoising an image.

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A LITERATURE REVIEW OF LINEAR PROGRAMMING PROBLEMS: BASED ON CASE

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Abstract

The determination of this report is an attempt to get an insight into linear programming in resolving the optimal combination of various products. It is an influential optimization technique and a significant field in the areas of science, engineering, and business. Although it has an irresistible amount of real-life application the linear programming technique is still to obtain the preferred level of appreciation and recognition. The usual public does not appear to empathize and the worth of the impact of linear programming and its constituents' study to enhance the decision- making process.
Keywords: Linear Programming Problem, Optimization Technique, Decision-Making and Modeling.

INTRODUCTION

Linear programming is a technique to attain the finest conclusion (for example highest profit or lowest cost). In an arithmetic model whose conditions are portrayed by the linear relationship. It is an appropriate case of mathematical programming. It is a simple technique where we interpret multiple relationships through linear function and then spot the optimum points. The persuasion for the necessity of the linear programming occurred during the wartime because they needed ways to settle many complex planning problems. The simplex method which is used to determine linear programming was evolved by George B.Dantzig in 1947. He was the one who did a lot of work on linear programming. During world war II he was operating in the pentagon with the military than one of his friends confronted him and demanded to hasten up the organization operation. The discovery of the simplex method was an explanation. Linear programming is an influential implement to solve many problems that arise in different areas of the outside world. The Simplex method is a universal technique of elucidating] the most linear programming since the 1940s. It is fundamentally used when the variables are in a large number. Many approaches that aim to crack the mathematical problems, but the simplex method has proved to be the most actual linear program which is used to articulate a real-world problem into a mathematical model. It comprises of numerous terminologies that are expressed below:
1.**Decision Variable:** Decision variables are the ones that determine the output. It contributes to the crucial result. To confront any problem, we first require distinguishing the decision variable.
2.**Objective Function**: It is described as the objective of creating a decision.
3.**Constraints**: The constraints are the restrictions on the decision variable. They bound the value of the decision variable.
4.**Non -negative restriction**: To solve all the linear problems the decision variable should take non- negative values for all the time which implies that the value of the decision variable should be greater than or equal to 0.We have outlined the procedure to express the linear programming problem along these lines:
1. Recognize the decision variable.
2. Pen down the objective function.
3. Declare the constraints.
4. Overtly state the non-negative limitation.
The mandatory condition for a problem to be a linear programming problem is that the decision variables, objective function, and constraints have to be linear functions.
This paper adds to the analysis of numerous usages of linear programming in real life obstructions. A various number of applications of linear programming are chosen from the former fictions and are reviewed to get an appropriate vision centered on many real-life problems. Some illustrations are discussed based on the application of optimization techniques.

OBJECTIVES OF STUDY

The intention of conducting this study is as follows:

To concentrate on the efficiency of linear programming in resolving the optimal combination of various products.

Case 1

The first case is selected from the paper called “Some Applications of Simplex Method “proposed by (Divya K.Nadar). This study discusses the importance of the simplex method and its application. The simplex method has played a crucial part throughout many years in dealing with real-world problems and however the simplex method is still improving to get the desired optimum solution. Even though several other methods have been established over the years for answering LP problems, but the simplex method endures being the most effective and accepted method for solving common LP problems. In this study, the author has discussed the analysis and interpretation of applications of the simplex method.Some conclusions can be depicted like The Dantzig’s Simplex method can be adjusted to the forming process to investigate the optimization of some sand casting parameters for the best results. According to this method, it is estimated that it is dependable for elucidating the least rate stream with fuzzy parameters in which the outcome of the initial dual feasible solution appears to be a frivolous job. Through the simplex method, we can obtain the optimal point in a polyhedron that outspreads into the deleterious domain. Thus, the necessity to spread the extent of the LP problem to fetch the entire polyhedron into the positive domain is eradicated.

Case 2

This case is taken from the paper titled “Using the Simplex Method to Solve Linear Programming Maximization Problems” by (J. Reeb and S. Leavengood). Linear programming, or LP, is a technique of reserves in an optimal methodology. It is one of the majorly used operations research (OR) tools. In this perspective, it implies to a formation method that distributes supplies—labor, materials, machines, and capital—in the finest possible (optimal) way such that costs are minimized, or profits are maximized. The simplex method was operated to explain a maximization problem with constraints of the form of < (less than or equal to).
It has been used magnificently as a conclusion making support in nearly all industries and financial and service organizations. In this framework, it indicates a development method that assigns resources—labor, materials, machines, and capital and is ensured that it works in the best achievable(optimal) manner such that costs are lessened, and profits are expanded.

Case 3

Another case is taken from the research paper titled “Effect of Seven Steps Approach on Simplex Method to Optimize the Mathematical Manipulation” by (Mohammad Rashid Hussain, Mohammed Qayyum, Mohammad Equebal Hussain). According to this study, the Simplex method is the most general and effective manner for working out the linear programs. In this study, a systematic methodology is used to solve LPP with some different methods named "key element rule" also known as seven steps process and it is still in the procedure and is used extensively. In this paper, the author has projected a modern system that is named as seven processes in LPP for the simplex, BIG- M, and two-phase methods to achieve a result with complexity decrease. As a result of this process, we can get the desired outcome in a limited period. They have concisely performed seven steps that are used in the simplex method. They have used the simplex method for carrying out maximization problems with different constraints like $\leq$, $\geq$ and = constraints. In this paper, we discovered the application of LPP in the economy which is working as an economic tool for understanding investigation to decrease the intricacy over calculation using presented simplex algorithm.

Case 4

This case is selected from the paper called “Application of Linear Programming for Optimal Use of Raw Materials in Bakery” by Akpan, N. P.& Iwok, I.A. Department of Mathematics/Statistics University of Port Harcourt Nigeria. The progress of linear programming has been graded amid the most imperative methodical encroachments of the mid-20th century. This composition applied the notion of the Simplex algorithm. It is used as a facet of linear programming to assign unprocessed items to challenge variables (big loaf, giant loaf,

and small loaf) in the bakery for the objective of profit growth. The purpose of this investigation was to use linear programming for the ideal depletion of raw material in bread production. At present, it is a universal means that has averted rational dimension in the various manufacturing countries of the planet. Sometimes many production companies encounter many difficulties in how to exploit the obtainable reserves to maximize profit. The function of linear programming generated an appropriate measurable methodology of decision-making, but it has not been wholly applied.

Case 5

Linear programming is an eminent aspect of operational research which is been studied and is developing quickly and is a widely used and mature approach. There are many real-life problems in operation research which can be articulated as linear programming problems. This case is taken from the paper titled "Achieving Optimal Solution of Linear Programming Based on Mobile Agent Technology" by Guo - Feng Ma1, Jun-hong Yang, Ping- Chuan Zhang. Linear programming has a lot of engineering applications and one of them has been introduced in this study. This paper presented the third dispersed calculation technology that is Mobile Agent to the linear programming problems, proposed the algorithm in a short period complexity related to the conventional method. This study talked about a new method which is a blend of linear programming problems and the AGENT a new technology was introduced called the AGENT technology.

Case 6

Another case and the last one is taken from the paper called "Optimization Research of Generation Investment" based on the Linear Programming Model by Juan WU1, Xueqian GE. This paper is purely based on the linear programming model where they have used optimized decision making to stimulate and analyze. Conferring to this study, Linear Programming is a subdivision of operational research, and mainly a mathematical approach has become the decision foundation of the manufacturing, marketing, bank loans, stock quotes, taxi fees, co-ordinate transportation, telephone charges, computer access, and so hot practical problems. In general, linear programming is a method of deciphering the maximum or minimum values under linear constraints. We have three elements of linear programming which are been discussed namely decision variable, constraints, and objective function. This paper has proposed a new language called GAMS.GAMS is a progressive stimulation and optimization language and it is composed of many complex languages like linear programming LP, non-linear programming, etc. This paper talks about the optimized simulation models and they have worked on how to decide the established ability and to achieve the optimal technique and economic outcome and are used to analyze the speculation of power plant and the optimal design of power plant operation was made. We can conclude here by saying that the applications of GMAS not only solve the linear programming problems, but they can also change the machine dialogue and make it work accordingly and achieves satisfactory results with the decision-makers.

CONCLUSION

Linear Programming (LP) is a meticulous sort of procedure operated for economic distribution of 'scarce' or 'limited' resources, such as labor, kinds of stuff, instruments, period, warehouse space, capital, power, etc. to some contending happenings, for instance, manufactured goods, amenities, occupations, latest equipment, projects, etc. based on certain measures of optimally. The locution "scarce resources" signifies resources that are limited in accessibility throughout the development period. The norm of optimality usually is either implementation, yield on investment, profit, cost, utility, time, distance, etc. Our paper has made an effort to review a few instances from the prevailing literature of linear programming. This study has selected several purposes of linear programming and has studied distinct cases on the application of optimization techniques in business, irrespective of economic condition, and many more. It was spotted that a prodigious amount of real-world problems is resolved beyond the use of optimization techniques and some software is used to achieve satisfying results. In the end, we would conclude that linear programming should be espoused in all the workable real-world problems to accomplish the finest decision making and to improve the proficiency

of any sort and advanced decision- making capacity will head up to the principal purpose that is revenue intensification of any field by using the optimal research.

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INVESTIGATION OF RESISTANCE SPOT WELDABILITY OF TITANIUM ALLOY WITH ALUMINUM ALLOY

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ABSTRACT

Commercially pure titanium (CP-Ti) is of great importance at least as much as an aluminum alloy in many industrial applications because of low density, biologically compatible properties, and high corrosion resistance. However, the weldability of CP-Ti is poor, especially with different metal alloys. In this study, the weldability of ASTM Grade 2 commercially pure titanium sheet alloy with 5754 aluminum alloy was investigated related to the welding parameters. Resistance spot welding has been used as a welding method since it has an important place in the automotive. The weld nugget diameter and tensile-shear test results of the welded samples were examined, and the mechanical properties were compared. As a result of the tests, it was seen that the welding current has a significant effect on the weldability and mechanical properties of the titanium-aluminum alloy welding joints. When the welding current increased from 6 kA to 16 kA, the weld nugget diameter 29% increased. But, more increase in welding current did not affect the nugget diameter. The expulsion was observed along the edge of the nugget region on the titanium side in specimens in the case of high welding currents. The maximum tensile-shear load of the resistance spot welded joints was observed in the specimen welded with 14 kA welding current.

Keywords: Commercialy pure titanium; Aluminum alloy; Resistance spot welding; Nugget diameter; Mechanical properties

INTRODUCTION

Titanium alloys are important materials that are used in many fields such as biomedical, aerospace, automotive, defense, marine and chemical industries. They are widely used in structural parts of aircraft, especially in parts exposed to high temperatures such as engines, implants and prostheses thanks to its biocompatibility. In many jet engines, titanium-based alloys make up 20% to 30% of the net weight. In addition, the low density of titanium alloys, high corrosion resistance, low thermal conductivity, resistance at high temperatures, high strength, low elasticity module, long service life and competitive properties with composite structures. However, demand in the energy needs of the automotive industry has increased sharply, and great efforts made for lighter vehicle designs to improve fuel economy, reduce air pollution, and higher performance. The studies

related to light-weighting generally include material improvement. In the frame of material improvement, the use of light metal alloys such as aluminum alloys, magnesium alloys, titanium alloys, or polymer-based materials have an important place (Wang et al., 2015; Kaya and Kahraman, 2011). However, joining these materials has always been an important problem for manufacturers.

Electric resistance welding and friction stir spot welding are the most commonly used methods for joining different metals in the automotive industry. Application areas are limited due to some problems occurring in the process of friction stir spot welding (Che et al., 2018). Fusion welding methods are the most preferred techniques for joining materials because of their high strength and their ease of application for complex designs (Pereira et al., 2010). Resistance spot welding (RSW) is a process in which metal sheets are assembled as lap joints and clamped together by two water-cooled electrodes. Unfortunately, this technique shows a significant drawback when it is applied to dissimilar materials because of the inherent discrepancies in electrical, thermal, and mechanical properties between the two materials. In the literature, there is a limited number of studies about the welding parameters effect on the mechanical properties of the dissimilar welded sheets (Sun et al., 2004; Satonaka et al., 2006; Qiu et al., 2009). In most of these studies, welding was performed by using an interlayer between the materials or cover plate to improve metallurgical reaction and decrease residual stress.

This study aims to investigate the weldability of resistance spot welded CP-Ti alloy to 5754 aluminum alloy sheets related to the welding parameters without using interlayer. Tensile-shear tests, and welding nugget diameter were used to analyze the mechanical properties of the spot welded joints.

EXPERIMENTAL

In this study, 1 mm thick CP-Ti (Ti-Gr2), and A5754 aluminum alloy sheets were used as the materials to be welded. Chemical compositions, and mechanical properties of these materials are given in Table 1, and Table 2, respectively.

Table 1. The chemical composition of Ti-Gr2 and A5754 (wt.%).

Materials	C	Mn	Si	Al	Cr	Ti	Mg	Fe	Cu	O
Ti-Gr2	0.1					99.2		0.3		0.25
A5754		0.35	0.21	95.4	0.03	0.15	2.8	0.4	0.05	

Table 2. The mechanical properties of Ti-Gr2 and A5754 alloys.

Materials	Yield Strength (MPa)	Tensile strength (MPa)	Elongation (%)	Vickers microhardness (HV0.5)
Ti-Gr2	278	344	20	155
A5754	195	225	12	90

The welding process was carried out using a 400 kVA MFDC water-cooled resistance spot welding machine. Zirconium alloyed electrodes with a tip diameter of 8 mm were used for dissimilar welding. Before welding,

all specimens were polished with sandpapers and then washed with acetone to remove oxides and dirt on the surfaces. The resistance spot welding parameters include the welding current, 200 ms welding time, 3 bar electrode force, and the experimental conditions are shown in Table 3.

Table 3. Welding parameters used in this study.

Welding parameters	Specimens						
	S1	S2	S3	S4	S5	S6	S7
Welding current (kA)	6	8	10	12	14	16	18

In this study, to investigate the mechanical performance of the spot welds tensile-shear tests were performed. Tensile-shear tests were performed at ZWICK universal tensile test machine with a load capacity of 150 kN under a cross-head velocity 1 mm/min at room temperature. Dimensions of the tensile-shear test specimen are given in Figure 1.

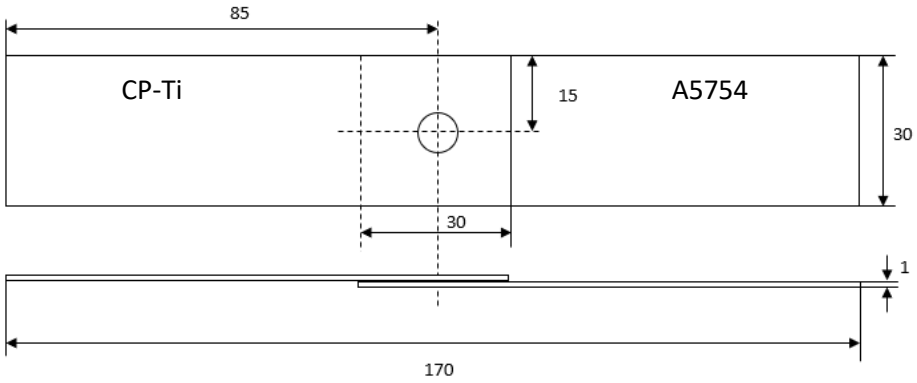

Figure 1. Dimensions of tensile-shear specimen welded by RSW (mm).

RESULTS AND DISCUSSION

Nugget diameter

Figure 2 shows the effect of the welding current on the weld nugget diameter. The heat generation at the welding interface is effected primarily from the welding current and nugget diameter increased with welding current increasing until 12 kA. At low current values, there was no significant change in the nugget diameter, while it was increased after 8 kA. When the welding current increased from 8 kA to 12 kA, the weld nugget diameter 29% increased. But, more increase welding current did not affect the nugget diameter. Amount of melted nugget is a function of welding heat input. By increasing weld current produced heat increases which in turn, increase the diameter of nugget.

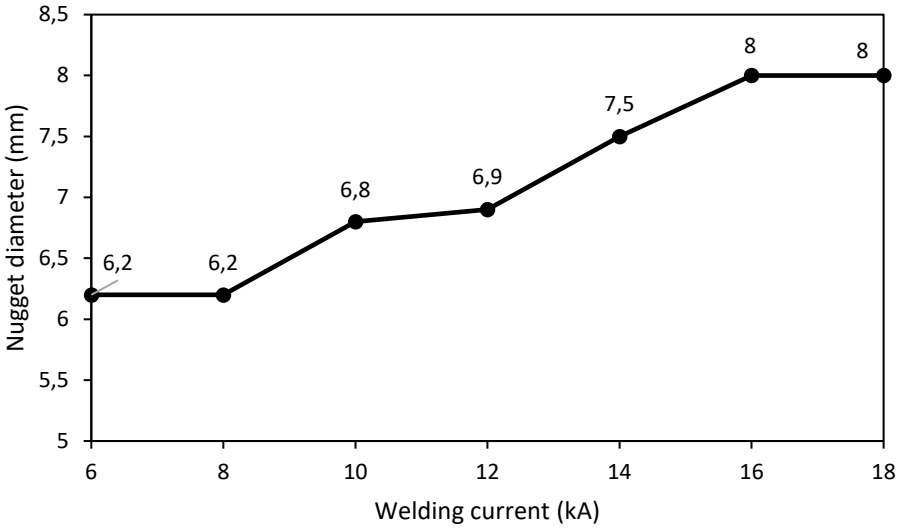

Figure 2. Nugget diameters of the Ti-Gr2 alloy- A5754 alloy joints welded under different welding currents.

Tensile-shear Tests

Tensile-shear tests were performed to evaluate the mechanical properties of the joints. Fracture appearance after the tensile-shear test and expulsion formation at the faying surface between Ti-Gr2 alloy- A5754 alloy joints with different welding currents were given in Figure 3. It is seen that two types of fracture were observed in the samples after the tensile-shear test. Interfacial shear type fracture occurred in the specimens when the welding current was 8 kA, and 10 kA given in Fig. 3. With the current increase to 12 kA, 14 kA, 16 kA, and 18 kA, fracture mode changed and occurred in pullout failure. In the pullout failure mode, material separation occurred on the aluminum side in all specimens of the joints. The dissimilar physical and thermal properties of the aluminum and titanium resulted in non-uniform thermal distributions and formation of weld pools at different times, crack formation under cooling due to mismatch of thermal expansion coefficients and generation of internal residual stresses (Pardal, 2016). Welding current increase leading to a high current density passing through the weld nugget zone increased non-uniform thermal distributions and severe expulsion at the interface between the sheets. In the nugget region, especially on the titanium side, expulsion

along the edge is observed. There was no expulsion on the weld nugget surface at 8 kA and 10 kA, when the welding current increased burning formation was increased along the edge of the weld nugget.

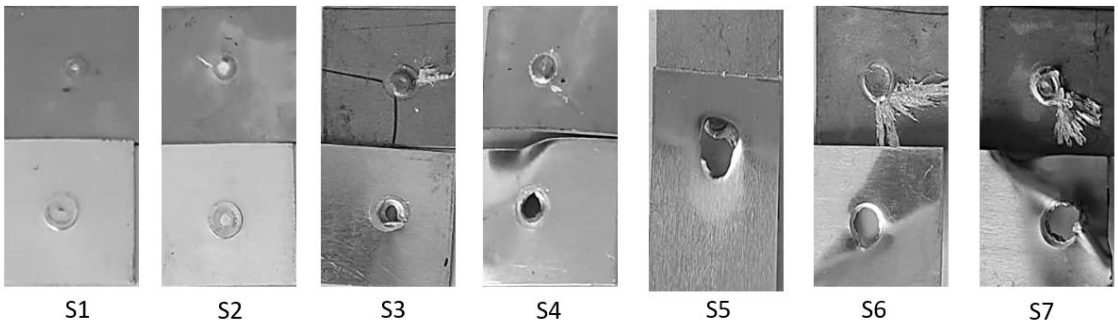

Figure 3. Fracture appearance after the tensile-shear test and expulsion formation at the faying surface between Ti-Gr2 alloy- A5754 alloy joints with different welding currents.

Fig. 4 shows tensile-shear test results of the Ti-Gr2 alloy- A5754 alloy joints variations with welding current. Tensile-shear strength increases rapidly with increasing current density. Higher welding current values were caused molten metal expulsion (as shown in Fig. 3) and lower mechanical strength properties. Because overheat the base metal was resulted in deep indentations in the parts and rapid deterioration of the electrodes. In the tensile-shear test, S1 and S2 samples were separated from their interfaces during insertion. The low welding current caused the heat required for penetration at the interface to not occur. The maximum tensile-shear strength was obtained from 14 kA welding current.

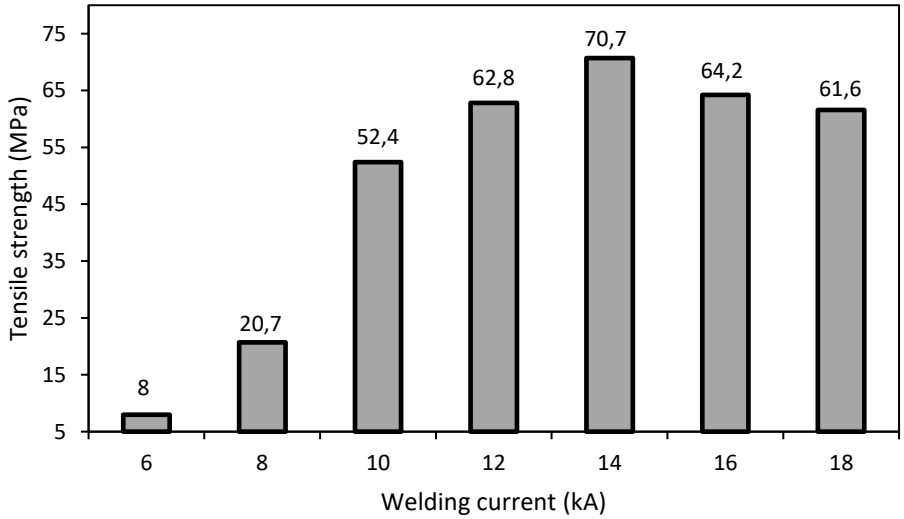

Figure 4. Tensile-shear test results of the Ti-Gr2 alloy- A5754 alloy joints welded under different welding currents.

CONCLUSIONS

In this study, the dissimilar welding between Ti-Gr2 and A5754 alloys sheets was carried out by resistance spot welding under different welding currents. From this investigation, the following conclusions were derived:

- The welding nugget diameter increased with welding current until 12 kA. However, the increase in welding current after 12 kA did not affect the nugget diameter.

- Tensile-shear test results show that, the increase of welding current increased the maximum tensile-shear strength. However, if the welding current was 14 kA, compared to 16 kA, and 18 kA showed higher strength in welded joints.

- The fracture type and expulsion formation at the interface between the sheets varied depending on the welding current. Interfacial shear type fracture occurred in the specimens when the welding current was 6 kA and 8 kA, and fracture mode changed with welding current increase. The material separation in nugget zone occurred on the aluminum side in all specimens of the joints.

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A NEW FILTER FOR SAFE VIEW OF SOLAR ECLIPSE

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Abstract

Looking directly at the sun can lead to permanent eye injury due to damage of light-sensitive rod and cone cells within the retina. There are two ways to look at the Sun safely: by observing the sun directly through a suitable filter, or by projecting the Sun's reflection onto a piece of paper via handmade pinhole camera/ telescope. The present correspondence shows the specification for the development of an optical instrument for the direct observation of sun. For this device, commonly available solar control glass plates can be used. The design of this filter is based on the fact that both visible and UV radiation comply with the law of Reflection and Refraction of light. As light rays appeared on the glass plate, most of the rays pass through the glass after refraction. A portion of the incident ray is mirrored and goes out to the next glass panel, where the same thing is going to happen. Through this way, multiple glass plates reflect the light ray before diffuse light is received. Owing to the fact that diffuse reflection is responsible for the ability to see most illuminated objects, we will be able to see the dull image of sun directly through this filter during the solar eclipse.

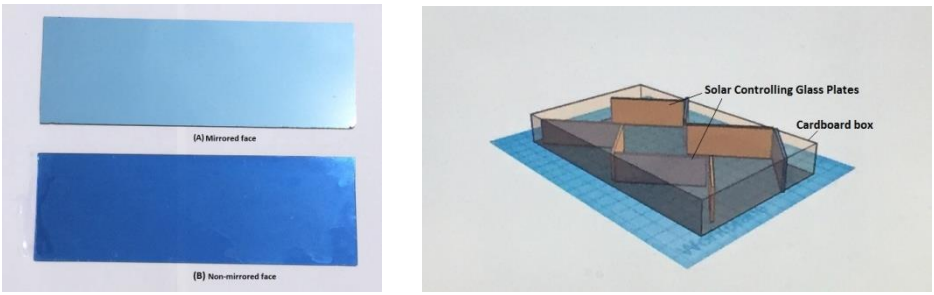
Key Words: Solar filter, Solar Eclipse, Diffuse Light, sun light controlling glass

INTRODUCTION

Eclipse of the sun occurs as the new moon passes between earth and the sun. If the moon occupies the whole disk of the sun, there is a complete eclipse of the sun with the corona. In the eclipse, the moon's shadow is cast on the earth and travels more than 1,000 miles per hour across the earth surface. Direct solar observations during the eclipse will result solar retinopathy (Chou,1997). The clinical condition is also known as photomaculopathy, eclipse retinopathy and foveomacular retinitis. Solar retinopathy symptoms typically occur within 1 to 4 hour after exposure and include decreased vision, metamorphopsia, micropsia, and central or paracentral scotomata (Afaq et al., 2007; Baisakhiya et al., 2013). Chromatopsia and photophobia can also be present in patients (Yannuzzi et al., 1987). There are two ways to look at the Sun safely: by observing the sun directly through a suitable filter, or by projecting the Sun's reflection onto a piece of paper via handmade pinhole camera/ telescope. With the exception of pinhole camera, solar filters and telescope are beyond the reach of people from small towns and cities. The present correspondence suggests the specification for the development of direct observation optical instrument that is not only cheap but easy to build at home with solar control glass plates.

MATERIALS AND METHODS

This optical system uses the solar control glass plates. These plates are cut into the small rectangular pieces with the dimensions of 5cm x3 cm. Each glass plate is arranged on the card board as shown in Figure.1(B) so that each may reflect the incident rays at right angle. The glass plates are also fixed on the card board at right angle with the help of clamps. Few cardboard plates are also fixed on the base as shown in the Figure.2 to minimize the interference of rays. It should be in mind when arranging the plates, the shiny /mirrored face of plate should be towards incident side.



(A) (B)

Figure:1 (A) Solar control glass showing different faces (B) Arrangement of glass plates in cardboard box (The number of glass plates shown is for presentation purposes only)

RESULT AND DISCUSSION

Mechanism of the filter:

The detailed mechanism of the filter is shown in the Figure.2. The design of the proposed filter is based on the fact that both visible and UV radiation comply with the law of Reflection and Refraction of light. As Sunlight incident on the first glass plate, most of the rays pass through the glass after refraction. A portion of the incident ray is mirrored at right angle and goes out to the second glass panel where a large portion of light is refracted again. After reflection from the second plate, the light rays incident on the next glass plate where the same thing is going to happen. Through this way, multiple glass plates refract and reflect the light ray before diffuse light is received. Owing to the fact that diffuse reflection is responsible for the ability to see most illuminated objects, we will be able to see the dull image of sun directly through this filter during the solar eclipse.

CONCLUSION

This is new solar filter to view the solar eclipse efficiently. Further research on the proposed solar filter is needed to improve its function.

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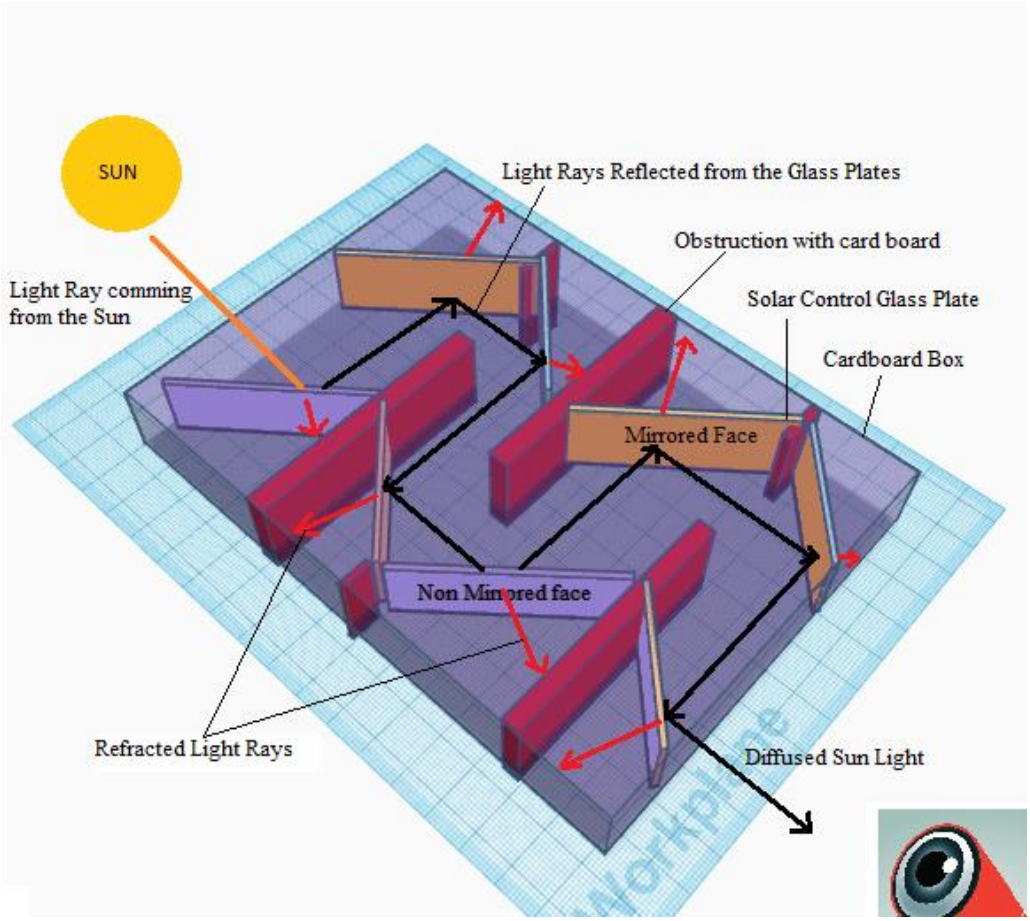

Figure 2. Mechanism of new solar filter (The number of glass plates shown is for presentation purposes only)

ON FUZZY CONTRA PRE-γ-CONTINUOUS MAPPINGS IN FUZZY TOPOLOGICAL SPACES

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Abstract

In fuzzy topology and its related fields of mathematics, a fuzzy continuous map is a function between two fuzzy topological spaces. A fuzzy mapping is continuous specifically if its pre images of open fuzzy sets are again open fuzzy sets. On the other hand, a fuzzy mapping is contra continuous, if its pre images of open fuzzy sets are closed fuzzy sets. In this study, we introduce notions of fuzzy contra pre-γ-continuous mappings, fuzzy almost contra pre-γ-continuous mappings in fuzzy topological spaces via pre-γ-open fuzzy sets. We investigate properties and relationships between fuzzy contra pre-γ-continuous mappings and fuzzy almost contra pre-γ-continuous mappings.

Keywords: Fuzzy topology, fuzzy contra pre-γ-continuous map, fuzzy almost contra pre-γ-continuous map, fuzzy pre-γ-open fuzzy sets.

INTRODUCTION

Zadeh [17] introduced the notion of fuzzy sets in his classical paper. As a generalization of topological spaces, the notion of fuzzy topological spaces was initiated and investigated by Chang [2]. In the recent papers, many topologists had focused their research in the direction of analyzing various types of generalized continuity. Dontchev [3] introduced a new type of mappings called contra-continuity mappings in general topology. Kasahara [7] defined the notion of an operation γ on a topological space in 1979. In general topology, Ogata [8] introduced the notion of γ-open sets which are weaker than open sets. The fuzzy operation γ and fuzzy γ-open sets were introduced by Kalita and Das [6]. The notion of pre-γ-open sets and pre-γ-open mappings in topological spaces were introduced by Hariwan Z. Ibrahim [4, 5]. Recently Sivashanmugaraja and Vadivel [15] defined and discussed about pre-γ-open fuzzy sets in fuzzy topological spaces. This paper is devoted to introduce and investigate a new class of mappings called fuzzy contra pre-γ-continuous and fuzzy almost contra pre-γ-continuous mappings. We study some fundamental properties and theorems about them. Further, we investigate relationships between fuzzy contra pre-γ-continuous and fuzzy almost contra pre-γ-continuous mappings.

PRELIMINARIES

Throughout this paper (X, τ_X), (Y, τ_Y) and (Z, τ_Z) (or simply X, Y and Z) always mean a fuzzy topological spaces (fts, for short). The interior, the closure and the complement of a fuzzy set λ in I^X are denoted by int(λ), cl(λ) and λ^c respectively. By $\underline{0}$ and $\underline{1}$, we mean the constant fuzzy sets taking on the values 0 and 1 respectively. Now we recall some important related definitions.

Definition 2.1. [6] Let (X, τ_X) be a fuzzy topological space. A fuzzy operation γ on the topology τ_X is a mapping from τ into set I^X such that $\lambda \subseteq \gamma(\lambda)$, $\forall\ \lambda \in \tau_X$, where $\gamma(\lambda)$ denotes the value of γ at λ.

Definition 2.2. [6] A fuzzy set λ of a fts (X, τ_X) is called a fuzzy γ-open, if $\forall\ p_x^{\lambda}\ q\ \lambda$, $\exists$ a $\mu \in \tau$ and $p_x^{\lambda}\ q\ \mu$ such that $\gamma(\mu) \leq \lambda$. τ_γ denotes the set of all γ-open fuzzy sets. Clearly we have $\tau_\gamma \subseteq \tau_X$.

Definition 2.3. A fuzzy set λ of a fuzzy topological space X is called

(i) fuzzy pre-γ-open [15], if $\lambda \leq \tau_\gamma$-int(cl(λ)).
(ii) fuzzy pre-γ-closed [12] iff its complement is fuzzy pre-γ-open.
(iii) fuzzy regular open [1], if λ = int(cl(λ)).

The family of all pre-γ-open and pre-γ-closed fuzzy sets are denoted by $FP_\gamma O(X)$ and $FP_\gamma C(X)$ respectively.

Definition 2.4. [12] Let λ be a fuzzy set in a fts X. Then the pre-γ-interior of λ is defined as $pint_\gamma(\lambda) = \vee\{\mu : \mu \leq \lambda, \mu \in FP_\gamma O(\tau)\}$ and pre-γ-closure of λ is defined as $pcl_\gamma(\lambda) = \wedge\{\mu : \mu \geq \lambda, \mu \in FP_\gamma C(\tau)\}$.

Definition 2.5. A mapping $f : (X, \tau_X) \to (Y, \tau_Y)$ is called

(i) fuzzy continuous [2], if $f^{-1}(\mu)$ is an open fuzzy set of X, for each open fuzzy set μ of Y.
(ii) fuzzy pre-γ-continuous [14], if $f^{-1}(\lambda)$ is pre-γ-open fuzzy set in X, for each open fuzzy set λ in Y.
(iii) fuzzy weakly pre-γ-continuous [14], if $f^{-1}(\mu) \leq pint_\gamma (f^{-1}(pcl_\gamma(\mu)))$, for each open fuzzy set μ in Y.
(iv) fuzzy pre-γ-irresolute [14], if $f^{-1}(\lambda)$ is pre-γ-open fuzzy set of X, for each pre-γ-open fuzzy set λ of Y.
(v) fuzzy pre*-γ-open [11], if the image of each pre-γ-open fuzzy set of X is pre-γ-open fuzzy set in Y.

Definition 2.6. [9] Let λ be a fuzzy set of a fts (X, τ_X). Then the kernel of λ is given by $\ker(\lambda) = \wedge\{\eta \in \tau : \lambda \leq \eta\}$.

Lemma 2.1. [9] For any two fuzzy sets λ and μ of a fts (X, τ), the following statements are holds :

(i) $x \in \ker(\lambda)$ iff $\lambda \wedge \eta \neq \varphi$, for any closed fuzzy set η of X containing x;
(ii) If λ is open fuzzy set in X and $\lambda \leq \ker(\lambda)$, then $\lambda = \ker(\lambda)$;
(iii) If $\lambda \leq \mu$, then $\ker(\lambda) \leq \ker(\mu)$.

Definition 2.7. A fuzzy topological space (X, τ_X) is called

(i) fuzzy pre-γ-connected [10] if it has no proper pre-γ-clopen.
(ii) fuzzy pre-γ-compact [10] if each pre-γ-open covering of X contains a finite sub collection that also covers X.
(iii) fuzzy pre-γ-T_1[13], if for each pair of fuzzy singletons p_0 and p_1 with different supports x_0 and x_1, there exists a pre-γ-open fuzzy sets λ and μ such that $p_0 \leq \lambda \leq p_1{}^c$ and $p_1 \leq \mu \leq p_0{}^c$.
(iv) fuzzy pre-γ-Hausdorff or fuzzy pre-γ-T_2 [13] iff each pair of fuzzy singletons p_0 and p_1 with different supports x_0 and x_1, there exists a pre-γ-open fuzzy sets λ and μ such that $p_0 \leq \lambda \leq p_1{}^c$ and $p_1 \leq \mu \leq p_0{}^c$ and $\lambda \leq \mu$.
(v) fuzzy ultra normal [16] if for each pair of disjoint closed fuzzy subsets μ_1 and μ_2 of (X, τ), there exist disjoint clopen sets λ_1 and λ_2 such that $\mu_1 \leq \lambda_1$ and $\mu_2 \leq \lambda_2$.
(vi) fuzzy pre-γ_2-normal [13] for each pair of closed fuzzy subsets μ_1 and μ_2 such that $\mu_1 \wedge \mu_2 = 0$, there exist pre-γ-open sets λ_1 and λ_2 such that $\mu_1 \leq \lambda_1$ and $\mu_2 \leq \lambda_2$ and $\lambda_1 \wedge \lambda_2 = 0$.

FUZZY CONTRA PRE-γ-CONTINUOUS MAPPINGS

Definition 3.1. Let (X, τ_X) and (Y, τ_Y) be two fuzzy topological spaces and γ be a fuzzy operation on τ_X. A mapping $f : (X, \tau_X) \to (Y, \tau_Y)$ is said to be fuzzy contra pre-γ-continuous, if $f^{-1}(\lambda)$ is pre-γ-closed fuzzy set in X, $\forall$ open fuzzy set λ of Y.

Theorem 3.1. For a mapping $f : (X, \tau_X) \to (Y, \tau_Y)$, the following statements are equivalent:

(i) f is fuzzy contra pre-γ-continuous;
(ii) for every fuzzy singleton x_β in X and every closed fuzzy subset μ of Y containing $f(x_\beta)$, there exists a pre-γ-open fuzzy set λ in X such that $x_\beta \in \lambda$ and $f(\lambda) \leq \mu$;
(iii) $f^{-1}(\mu)$ is a pre-γ-open fuzzy set in X, $\forall$ closed fuzzy set μ of Y;

(iv) $f(pcl_\gamma(\lambda)) \leq ker(f(\lambda))$, for each fuzzy set λ in X;
(v) $pcl_\gamma(f^{-1}(\mu)) \leq f^{-1}(ker(\mu))$, for each fuzzy set μ in X;

Proof. (i) $\Rightarrow$ (ii) Let x_β be any fuzzy singleton in X and μ be any closed fuzzy set of Y containing $f(x_\beta)$. Then $x_\beta \in f^{-1}(\mu)$. Since f is fuzzy contra pre-γ-continuous, we obtain $f^{-1}(Y \setminus \mu)$ is pre-γ-closed fuzzy set in X and thus $f^{-1}(\mu)$ is pre-γ-open fuzzy set of X containing x_β. Take $\lambda = f^{-1}(\mu)$, then $x_\beta \in \lambda$ and $f(\lambda) \leq \mu$.

(ii) $\Rightarrow$ (iii) Let μ be any closed fuzzy set of Y and any fuzzy singleton $x_\beta \in f^{-1}(\mu)$. So $f(x_\beta) \leq \mu$. Therefore by hypothesis, there exists a pre-γ-open fuzzy subset λ containing x_β such that $f(\lambda) \leq \mu$, this implies that, $x_\beta \in \lambda \leq f^{-1}(\mu)$. Thus, $f^{-1}(\mu) = \vee\{\lambda : x_\beta \in f^{-1}(\mu)\}$ which is pre-γ-open fuzzy set in X. Hence f is fuzzy contra pre-γ-continuous.

(iii) $\Rightarrow$ (iv) Let λ be any fuzzy set of X and any fuzzy singleton y_β in $ker(f(\lambda))$. Then by Lemma 2.1., there exists a closed fuzzy set μ of Y containing y_β such that $f(\lambda) \wedge \mu \neq \varphi$. Thus, $\lambda \wedge f^{-1}(\mu) = \varphi$ and $pcl_\gamma(\lambda) \wedge f^{-1}(\mu) = \varphi$. Then $f(pcl_\gamma(\lambda)) \wedge \mu = \varphi$ and $y_\beta \in f(pcl_\gamma(\lambda))$. Thus $f(pcl_\gamma(\lambda)) \leq ker(f(\lambda))$.

(iv) $\Rightarrow$ (v) Let μ be any fuzzy subset of Y. Then by hypothesis and Lemma 2.1., we obtain $f(pcl_\gamma(f^{-1}(\mu))) \leq ker(f(f^{-1}(\mu))) \leq ker(\mu)$. Hence $pcl_\gamma(f^{-1}(\mu)) \leq f^{-1}(ker(\mu))$.

(v) $\Rightarrow$ (i) Let λ be any open fuzzy subset of Y. Then by hypothesis and Lemma 2.1., $pcl_\gamma(f^{-1}(\lambda)) \leq f^{-1}(ker(\lambda)) = f^{-1}(\lambda)$. So, $f^{-1}(\lambda)$ is pre-γ- closed fuzzy set in X. Thus f is fuzzy contra pre-γ-continuous.

Theorem 3.2. If a mapping $f : (X, \tau_X) \to (Y, \tau_Y)$ is fuzzy contra pre-γ-continuous and Y is fuzzy regular, then f is fuzzy pre-γ-continuous.

Proof. Let x_β be any fuzzy singleton in X and λ_1 be an open fuzzy set of Y containing $f(x_\beta)$. Since Y is a fuzzy regular space, then there exists an open fuzzy set λ_2 of Y such that $f(x_\beta) \in \lambda_2 \leq cl(\lambda_2) \leq \lambda_1$. But, if f is fuzzy contra pre-γ-continuous, then there exists a pre-γ-open fuzzy set μ in X such that $x_\beta \in \mu$ and $f(\mu) \leq cl(\lambda_2) \leq \lambda_1$. Thus, f is fuzzy pre-$\gamma$-continuous.

Remark 3.1. The composition of two fuzzy contra pre-γ-continuous mappings need not be fuzzy contra pre-γ- continuous as shown in the following example.

Example 3.1. Let X=Y=Z={a, b, c} and let $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ be the fuzzy sets of a fts X defined by

$\lambda_1(a) = 0.6, \lambda_1(b) = 0.8, \lambda_1(c) = 0.7;$
$\lambda_2(a) = 0.4, \lambda_2(b) = 0.5, \lambda_2(c) = 0.3;$
$\lambda_3(a) = 0.2, \lambda_3(b) = 0.4, \lambda_3(c) = 0.3;$
$\lambda_4(a) = 0.5, \lambda_4(b) = 0.6, \lambda_4(c) = 0.7.$

Let $\tau_X = \{\underline{1}, \underline{0}, \lambda_1, \lambda_2\}$, $\tau_Y = \{\underline{1}, \underline{0}\}$ and $\tau_Z = \{\underline{1}, \underline{0}, \lambda_3, \lambda_4\}$. Then clearly (X, τ_X), (Y, τ_Y) and (Z, τ_Z) are fts. Define $\gamma : \tau_X \to I^X$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$, $\gamma(\lambda_1) = \lambda_1$, $\gamma(\lambda_2) = \underline{0.8}$ and also define $\gamma : \tau_Y \to I^Y$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$. A mapping $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ defined as f(a) = b, f(b) = a, f(c) = c and also $f_2 : (Y, \tau_Y) \to (Z, \tau_Z)$ be an identity mapping. Then, f_1 and f_2 are fuzzy pre-γ-continuous mappings but $(f_2 \circ f_1)$ is not fuzzy pre-γ-continuous mapping. Since, λ_4 is an open fuzzy set of (Z, τ_Z), but $(f_2 \circ f_1)(\lambda_4)$ is not a pre-γ-closed fuzzy set of X.

Theorem 3.3. For any two fuzzy mappings $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ and $f_2 : (Y, \tau_Y) \to (Z, \tau_Z)$, the following statements are hold:

(i) If f_1 is fuzzy contra pre-γ-continuous and f_2 is fuzzy continuous mappings, then the composite map $(f_2 \circ f_1)$ is fuzzy contra pre-γ-continuous.
(ii) If f_1 is fuzzy pre-γ-irresolute and f_2 is fuzzy contra pre-γ-continuous mappings, then the composite map $(f_2 \circ f_1)$ is fuzzy contra pre-γ- continuous.

Proof. (i) Let λ be an open fuzzy set in Z. Since f_2 be a fuzzy continuous mapping, we obtain $f_2^{-1}(\lambda)$ is an open fuzzy set in Y. By hypothesis f_1 is fuzzy contra pre-γ-continuous, then $(f_2 \circ f_1)^{-1}(\lambda)$ is pre-γ-closed fuzzy set in X. Thus $(f_2 \circ f_1)$ is fuzzy contra pre-γ-continuous.

(ii) Let λ be an open fuzzy set in Z. Since f_2 be a fuzzy contra pre-γ-continuous, we obtain $f_2^{-1}(\lambda)$ is pre-γ-closed fuzzy set in Y. By hypothesis f_1 is pre-γ-irresolute, then $(f_2 \circ f_1)^{-1}(\lambda)$ is pre-γ-closed fuzzy set in X.

Thus, $(f_2 \circ f_1)$ is fuzzy contra pre-γ-continuous.

Theorem 3.4. Let $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ be an onto fuzzy pre-γ-irresolute and fuzzy pre*-γ-open mapping. Then $(f_2 \circ f_1) : (X, \tau_X) \to (Z, \tau_Z)$ is fuzzy contra pre-γ-continuous iff f_2 is fuzzy contra pre-γ-continuous.

Proof. Necessity: Obvious from Theorem 3.3..

Sufficiency: Let $(f_2 \circ f_1) : (X, \tau_X) \to (Z, \tau_Z)$ be a fuzzy contra pre-γ-continuous mapping and μ be closed fuzzy set in Z. Then $(f_2 \circ f_1)^{-1}(\mu)$ is pre-γ-open fuzzy set in X. Since f_1 is an onto pre*-γ-open mapping, we obtain $f_2^{-1}(\mu)$ is pre-γ-open fuzzy set in Y. Hence f_2 is fuzzy contra pre-γ-continuous.

Theorem 3.5. If $f : (X, \tau_X) \to (Y, \tau_Y)$ is an one-one closed and fuzzy contra pre-γ-continuous mappings, and is Y is fuzzy ultra normal, then X is fuzzy pre-γ_2-normal.

Proof. Let μ_1 and μ_2 be two disjoint closed fuzzy subsets of X. Since f is one-one closed, we obtain $f(\mu_1)$ and $f(\mu_2)$ are two disjoint closed fuzzy subsets of Y. By hypothesis, Y is fuzzy ultra normal space, then there exist two disjoint clopen sets λ_1 and λ_2 such that $f(\mu_1) \leq \lambda_1$ and $f(\mu_2) \leq \lambda_2$. Thus, $\mu_1 \leq f^{-1}(\lambda_1)$ and $\mu_2 \leq f^{-1}(\lambda_2)$. Since f is an one-one fuzzy contra pre-γ-continuous, $f^{-1}(\lambda_1)$ and $f^{-1}(\lambda_2)$ are two disjoint pre-γ-open fuzzy sets of X. Hence, X is fuzzy pre-γ_2-normal.

Theorem 3.6. If $f : (X, \tau_X) \to (Y, \tau_Y)$ is a fuzzy contra-pre-γ-continuous mapping and X is fuzzy pre-γ-connected, then Y is not a fuzzy discrete space.

Proof. If possible assume that Y is a fuzzy discrete space and λ be any fuzzy subset of Y. Therefore λ is open and closed fuzzy set in Y. By hypothesis f is fuzzy contra pre-γ-continuous, then $f^{-1}(\lambda)$ is pre-γ-open and pre-γ-closed fuzzy sets in X. This is a contradiction to fact that X is fuzzy pre-γ-connected. Thus, Y is not fuzzy discrete space.

Theorem 3.7. If $f : (X, \tau_X) \to (Y, \tau_Y)$ is a fuzzy contra pre-γ-continuous mapping, then f is fuzzy weakly-pre-γ-continuous.

Proof. Let x_β be any fuzzy singleton in X and λ be any open fuzzy set in X containing $f(x_\beta)$. Therefore cl(λ) is closed fuzzy set in Y. By hypothesis, f is fuzzy contra pre-γ-continuous, then $f^{-1}(cl(\lambda))$ is pre-γ-open fuzzy set in X and containing x_β. Take $\mu = f^{-1}(cl(\lambda))$, then $f(\mu) \leq cl(\lambda)$. Thus, f is fuzzy weakly-pre-γ-continuous.

Remark 3.2. The converse of the above Theorem 3.7., need not be true as shown in the following example.

Example 3.2. Let X=Y= {a, b, c} and $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ be the fuzzy sets of a fts X defined by

$\lambda_1(a) = 0.2, \lambda_1(b) = 0.4, \lambda_1(c) = 0.3;$
$\lambda_2(a) = 0.5, \lambda_2(b) = 0.7, \lambda_2(c) = 0.1;$
$\lambda_3(a) = 0.2, \lambda_3(b) = 0.4, \lambda_3(c) = 0.1;$
$\lambda_4(a) = 0.5, \lambda_4(b) = 0.7, \lambda_4(c) = 0.3.$

Let $\tau_X = \{\underline{1}, \underline{0}, \lambda_1, \lambda_2, \lambda_3, \lambda_4\}$, $\tau_Y = \{\underline{1}, \underline{0}, \lambda_1\}$. Then clearly (X, τ_X) and (Y, τ_Y) are fts. Define $\gamma : \tau_X \to I^X$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$, $\gamma(\lambda_1) = cl(\lambda_1)$, $\gamma(\lambda_2) = \underline{\lambda_2}$, $\gamma(\lambda_3) = \underline{0.8}$, $\gamma(\lambda_4) = \lambda_4$ and also define $\gamma : \tau_Y \to I^Y$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$, $\gamma(\lambda_1) = cl(\lambda_1)$. Let $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ be a fuzzy identity mapping. Then, f is fuzzy weakly pre-γ-continuous mapping but not fuzzy contra pre-γ-continuous.

FUZZY ALMOST CONTRA PRE-γ-CONTINUOUS MAPPINGS

Definition 4.1. Let (X, τ_X) and (Y, τ_Y) be two fuzzy topological spaces and γ be a fuzzy operation on τ_X. A mapping $f : (X, \tau_X) \to (Y, \tau_Y)$ is said to be fuzzy almost contra pre-γ-continuous if $f^{-1}(\mu)$ is pre-γ-closed fuzzy set in X, for every fuzzy regular open set μ of Y.

Proposition 4.1. For a mapping $f : (X, \tau_X) \to (Y, \tau_Y)$, then the following statements are equivalent

(i) f is fuzzy almost contra pre-γ-continuous;
(ii) For every fuzzy singleton x_β in X and every open fuzzy set μ of Y containing $f(x_\beta)$, there exists a pre-γ-open fuzzy set λ in X such that $x_\beta \in \lambda$ and $f(\lambda) \leq int(cl(\mu))$.

Theorem 4.1. A mapping $f : (X, \tau_X) \to (Y, \tau_Y)$ is fuzzy almost contra pre-γ-continuous iff for each fuzzy singleton x_β in X and each regular open fuzzy set μ of Y containing $f(x_\beta)$, there exists pre-γ-open fuzzy set λ in X containing x_β such that $f(\lambda) \leq \mu$.

Proof. Necessity. Let μ be a regular open fuzzy set in Y containing $f(x_\beta)$. Then $x_\beta \in f^{-1}(\mu)$. Since f is fuzzy almost contra pre-γ-continuous, we obtain $f^{-1}(\mu) = \lambda$ is regular open fuzzy set of X containing x_β such that $f(\lambda) = f(f^{-1}(\mu)) \leq \mu$.
Sufficiency. Let μ be a regular open fuzzy set in Y. To prove that $f^{-1}(\mu)$ is pre-γ-open fuzzy set in X. Assume that $x_\beta \in f^{-1}(\mu)$. Therefore $f(x_\beta) \in \mu$. By hypothesis, there exists pre-γ-open fuzzy set λ in X containing x_β such that $f(\lambda) \leq \mu$. Thus, $x_\beta \in \lambda \leq f^{-1}(f(\lambda)) \leq f^{-1}(\mu)$. Therefore $f^{-1}(\mu) = \vee\{\lambda : x_\beta \in \lambda\}$ is a pre-γ-open fuzzy set of X. Hence, f is fuzzy almost pre-γ-continuous.

Theorem 4.2. For a mapping $f : (X, \tau_X) \to (Y, \tau_Y)$, the following statements are equivalent:

(i) f is fuzzy almost contra-pre-γ-continuous;
(ii) $f^{-1}(\mu)$ is pre-γ-open fuzzy set in X, for each regular closed fuzzy set μ of Y, for each fuzzy singleton x_β in X and each regular closed fuzzy set μ of Y containing $f(x_\beta)$, there exists a pre-γ-open fuzzy set λ in X such that $x_\beta \in \lambda$ and $f(\lambda) \leq \mu$;
(iii) for each fuzzy singleton x_β in X and each regular open fuzzy set λ of Y not containing $f(x_\beta)$, there exists
a pre-γ-closed fuzzy set μ of X not containing x_β such that $f^{-1}(\lambda) \leq \mu$.

Proof. (i) ⇒ (ii) Let μ be any regular closed fuzzy set of Y. Therefore Y \ μ is regular open fuzzy set. By hypothesis, $f^{-1}(Y \setminus \mu) = X \setminus f^{-1}(\mu)$ is pre-γ-open fuzzy set in X. Hence, $f^{-1}(\mu)$ is pre-γ-open fuzzy set in X.
(ii) ⇒ (i) Evident.
(ii) ⇒ (iii) Let μ be any regular closed fuzzy set of Y containing $f(x_\beta)$. Then by hypothesis, $f^{-1}(\mu)$ is pre-γ-open fuzzy set in X and $x_\beta \in f^{-1}(\mu)$. Take $\lambda = f^{-1}(\mu)$, then $f(\lambda) \leq \mu$.
(iii) ⇒ (ii) Let μ be any regular closed fuzzy set of Y and $x_\beta \in f^{-1}(\mu)$. By hypothesis, there exist pre-γ-open fuzzy set λ in X such that $x_\beta \in \lambda$ and $f(\lambda) \leq \mu$. Thus, $x_\beta \in \lambda \leq f^{-1}(\mu)$, which implies $f^{-1}(\mu) = \vee\{\lambda : x_\beta \in f^{-1}(\mu)\}$. Hence, $f^{-1}(\mu)$ is pre-γ-open fuzzy set in X.
(iii) ⇒ (i) Let λ be any regular open fuzzy set of Y non-containing $f(x_\beta)$. Therefore Y \ λ is regular closed fuzzy set of Y containing $f(x_\beta)$. By (iii), there exists pre-γ-open fuzzy set η in X such that $x_\beta \in \eta$ and $f(\eta) \leq Y \setminus \lambda$. Then $\eta \leq f^{-1}(Y \setminus \lambda) \leq X \setminus f^{-1}(\lambda)$ and thus $f^{-1}(\lambda) \leq X \setminus \eta$. Since η is pre-γ-open fuzzy set in X, we obtain $X \setminus \eta = \mu$ is pre-γ-closed fuzzy set of X not containing x_β and $f^{-1}(\lambda) \leq \mu$.
(i) ⇒ (iii) Evident.

Remark 4.1. The composition of two fuzzy almost contra-pre-γ-continuous mappings need not be fuzzy almost contra-pre-γ-continuous as shown in the following example.

Example 4.1. Let X=Y=Z = {a, b, c} and $\lambda_1, \lambda_2, \lambda_3$ be the fuzzy sets of a fts X defined by
$\lambda_1(a) = 0.2, \lambda_1(b) = 0.6, \lambda_1(c) = 0.5;$
$\lambda_2(a) = 0.5, \lambda_2(b) = 0.3, \lambda_2(c) = 0.8;$ $\lambda_3 = \underline{0.5}$.
Let $\tau_X = \{\underline{1}, \underline{0}, \lambda_1, \lambda_2, \lambda_1 \vee \lambda_2, \lambda_1 \wedge \lambda_2\}$, $\tau_Y = \{\underline{1}, \underline{0}\}$ and $\tau_Z = \{\underline{1}, \underline{0}, \lambda_3\}$. Then clearly (X, τ_X), (Y, τ_Y) and (Z, τ_Z) are fts. Define $\gamma : \tau_X \to I^X$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$, $\gamma(\lambda_1) = \lambda_1$, $\gamma(\lambda_2) = \lambda_2$, $\gamma(\lambda_1 \wedge \lambda_2) = cl(\lambda_1 \wedge \lambda_2)$, $\gamma(\lambda_1 \vee \lambda_2) = \lambda_1 \vee \lambda_2$ and also define $\gamma : \tau_Y \to I^Y$ by $\gamma(\underline{1}) = \underline{1}$, $\gamma(\underline{0}) = \underline{0}$, $\gamma(\lambda_3) = \lambda_3$. A mapping $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ and $f_2 : (Y, \tau_Y) \to (Z, \tau_Z)$ are identity mappings. Then, f_1 and f_2 are fuzzy almost contra pre-γ-continuous mappings but $(f_2 \circ f_1)$ is not fuzzy almost contra pre-γ-continuous mapping. Since, λ_3 is open fuzzy set of Z, but $(f_2 \circ f_1)(\lambda_3)$ is not in pre-γ-closed fuzzy set of X.

Theorem 4.3. For any two fuzzy mappings $f_1 : (X, \tau_X) \to (Y, \tau_Y)$ and $f_2 : (Y, \tau_Y) \to (Z, \tau_Z)$, the following statements are hold:

(i) If f_1 is an onto fuzzy pre*-γ-open and $(f_2 \circ f_1) : X \to Z$ is fuzzy almost contra-pre-γ-continuous, then f_2 is fuzzy almost contra-pre-γ- continuous.
(ii) If f_1 is an onto fuzzy pre*-γ-closed and $(f_2 \circ f_1) : X \to Z$ is fuzzy almost contra-pre-γ-continuous, then f_2 is fuzzy almost contra-pre-γ- continuous.

Proof. (i) Let μ be regular closed fuzzy set of Z. By hypothesis, $(f_2 \circ f_1)$ is a fuzzy almost contra-pre-γ-continuous, then $(f_2 \circ f_1)^{-1}(\mu)$ is pre-γ-open fuzzy set of X. Since, f is an onto pre*-γ-open map, we obtain $f_2^{-1}(\mu)$ is pre-γ-open fuzzy set of Y. Hence, f_2 is fuzzy almost contra-pre-γ-continuous.

(ii) Evident.

Theorem 4.4. If $f: (X, \tau_X) \to (Y, \tau_Y)$ is an one-one fuzzy almost contra- pre-γ-continuous mapping and Y is fuzzy weakly Hausdorff, then X is fuzzy pre-γ-T_1.

Proof. Let x_α and x_β be two fuzzy singletons in X with different supports. Since f is an one-one, then $f(x_\alpha) = f(x_\beta)$ and since Y is weakly Hausdorff, there exist two regular closed fuzzy sets λ and μ such that $f(x_\alpha) \in \lambda$, $f(x_\beta) \notin \lambda$ and $f(x_\alpha) \notin \mu$, $f(x_\beta) \in \mu$. By hypothesis f is an fuzzy almost contra-pre-γ-continuous, then $f^{-1}(\lambda)$ and $f^{-1}(\mu)$ are pre-γ-open fuzzy sets in X such that $x_\alpha \in f^{-1}(\lambda)$, $x_\beta \notin f^{-1}(\lambda)$ and $x_\alpha \notin f^{-1}(\mu)$, $x_\beta \in f^{-1}(\mu)$ and $f^{-1}(\lambda) \wedge f^{-1}(\mu) = \varphi$. Thus X is pre-γ-$T_1$.

Theorem 4.5. Let $f : (X, \tau_X) \to (Y, \tau_Y)$ is an onto fuzzy almost contra pre-γ-continuous mapping. If X is fuzzy pre-γ-connected, then Y is fuzzy connected.

Proof. If possible assume that Y is not a fuzzy connected space. Then there is a proper fuzzy subset λ in Y which is both open and closed. Therefore λ is regular fuzzy set in Y which is both open and closed. Since f is a onto fuzzy almost contra pre-γ-continuous, $f^{-1}(\lambda)$ is a proper fuzzy set which is both pre-γ-closed and pre-γ-open in X. Thus X is not a fuzzy pre-γ-connected, which is a contradiction. Thus Y is fuzzy connected.

Theorem 4.6. If $f : (X, \tau_X) \to (Y, \tau_Y)$ is an one-one fuzzy almost contra pre-γ-continuous mapping and Y is fuzzy Urysohn space, then X is fuzzy pre-γ-T_2.

Proof. Let x_α and x_β be fuzzy singletons in X with different supports. Since f is an one-one, we have $f(x_\alpha) \neq f(x_\beta)$ in Y. By hypothesis Y is fuzzy Urysohn and thus there exist open fuzzy sets λ and η in Y such that $f(x_\alpha) \in \lambda$ and $f(x_\beta) \in \eta$ and $cl(\lambda)$ q $cl(\eta)$. Since λ and η is open fuzzy sets, $cl(\lambda)$ and $cl(\eta)$ are regular closed fuzzy sets in Y. f is fuzzy almost contra pre-γ-continuous implies that there exists fuzzy pre-γ-open sets μ_1 and μ_2 in X containing x_α and x_β respectively such that $f(\mu_1) \leq cl(\lambda)$ and $f(\mu_2) \leq cl(\eta)$. Since $cl(\lambda)$ q $cl(\eta)$, we obtain $f(\mu_1)$ q $f(\mu_2)$ and hence μ_1 q μ_2. This shows that X is fuzzy pre-γ-T_2.

Theorem 4.7. If $f : (X, \tau_X) \to (Y, \tau_Y)$ is an one-one fuzzy almost contra pre-γ-continuous and Y is fuzzy weakly T_2, then X is fuzzy pre-γ-T_1.

Proof. Let x_α and x_β be fuzzy singletons in X with different supports. Since f is an one-one, we obtain $f(x_\alpha) \neq f(x_\beta)$ in Y. Since Y is fuzzy weakly T_2, there exist regular closed fuzzy sets λ and μ in Y such that $f(x_\alpha) \in \lambda$, $f(x_\beta) \notin \lambda$, $f(x_\alpha) \notin \mu$ and $f(x_\beta) \in \mu$. Since f is fuzzy almost contra pre-γ-continuous, we obtain $f^{-1}(\lambda)$ and $f^{-1}(\mu)$ are fuzzy pre-γ-open sets in X such that $x_\alpha \in f^{-1}(\lambda)$, $x_\beta \notin f^{-1}(\lambda)$, $x_\alpha \notin f^{-1}(\mu)$ and $x_\beta \in f^{-1}(\mu)$. This shows that X is fuzzy pre-γ-T_1.

CONCLUSION

In this paper, we studied a new type of mappings called fuzzy contra pre-γ-continuity and fuzzy almost contra

pre-γ-continuity in fuzzy topological spaces. It is reported that every fuzzy contra pre-γ-continuous mapping is fuzzy weakly pre-γ-continuous, but the converse need not be true in general. Fuzzy contra pre-γ-continuous mappings and fuzzy almost contra pre-γ-continuity are independent each other. Further, we speculate that these mappings play a crucial role in computational fields of fuzzy topology and may have applications in parallel circuit of electric networks in relative fields of electrical and electronics engineering.

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GÜNEŞ ENERJİ SANTRALİ ÜRETİM VERİLERİNİN METEOROLOJİK VERİLERE BAĞLI OLARAK YAPAY ZEKA YÖNTEMLERİ İLE TAHMİNİ

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Özet

Güneş çekirdeğindeki hidrojen gazının helyuma dönüşmesi şeklinde tanımlayabileceğimiz füzyon süreci sonucunda açığa çıkan ışıma enerjisi, güneş enerjisidir.43 Dünyadan 330000 kat daha büyük olan güneş, doğal bir füzyon reaktörüdür. Güneş dünyamız için temiz ve tükenmez bir enerji kaynağıdır. Bu çalışmada yenilenebilir enerji kaynaklarından biri olan güneş enerjisinin üretim tahmini yapılmıştır. Bu çalışmada Doğu Anadolu Bölgesi'nde bulunan Elazığ ili Şahinkaya Mevkiinde Kurulu olan bir güneş enerji santralinin 2018 Ocak-2019 Aralık ayı arasındaki 24 aylık üretim verilerinin meteorolojik verilere (Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²) bağlı olarak tahmini yapılmıştır. Meteorolojik veriler T.C. Meteoroloji Genel Müdürlüğü Meteorolojik Veri Bilgi Sunum ve Satış Sistemi (MEVBİS)'ten alınmıştır. Çalışmada uygulanacak model Yapay sinir ağları (YSA)'nın MATLAB (R2018 Sürümü) yazılımı ile gerçekleştirilmiştir. Üretim tahmininin yapılabilmesi için yapay zekâ uygulamalarından olan doğrusal ve doğrusal olmayan modellerin tahmininindeki başarısı nedeniyle ileri beslemeli geri yayılımlı (feed-forwardbackrop) yapay sinir ağı kullanılmıştır. Learngdm öğrenme fonksiyonu ve oluşturulan veri setlerinin eğitilmesi amacıyla Levenberg Marquand (trainlm) eğitim algoritması, aktivasyon fonksiyonu olarak tanjant sigmoid fonksiyonu (tansig) kullanılarak YSA modeli dizayn edilmiştir. Tasarlanan YSA modeli 1000 iterasyon yapılarak eğitilmiştir. "0" hata 1e-7 gradient değeri kullanılmıştır. Elde edilen sonuçların değerlendirilmesinde iki adet değerlendirme indeksi kullanılmıştır. Bunlar; Ortalama Hata Karesi (MSE) ve elde edilen tahmin değerleri ile gerçekleşen üretim değerleri arasındaki ilişkiyi veren Korelasyon Katsayısı (R)'dır. MSE 0.01, R değeri ise 0.91816 (Eğitim:0.90415,Test:0.95375,Uyum:0.94917) olarak bulunmuştur. Tahmin edilen üretim güç değerlerinin (MWh) gerçek üretim güç değerlerine çok yakın değerler aldığı görülmüştür. Gelecekte yapılacak tahmin çalışmalarında geleneksel yöntemlere alternatif olarak YSA'nın başarılı bir şekilde uygulanabileceği gösterilmiştir.

Anahtar Kelimeler: Yenilenebilir Enerji, Güneş Enerjisi, Yapay Zeka, Tahmin

GİRİŞ

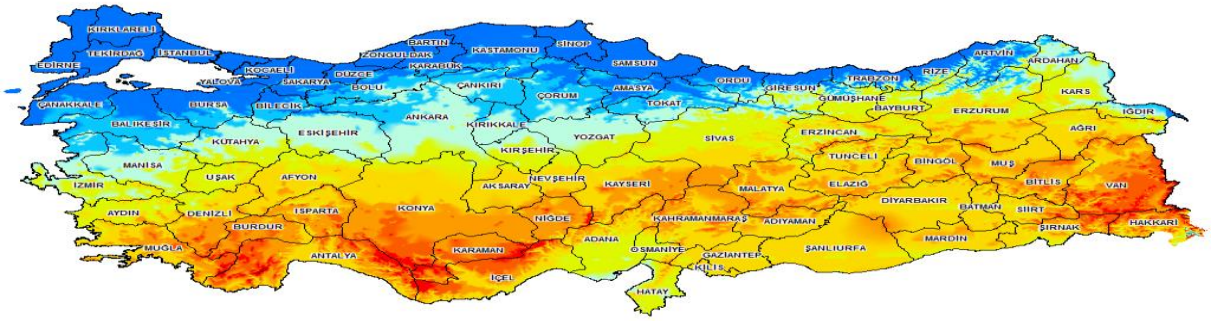
Fosil yakıt rezervlerinin hızla tükenmesi ve büyük sera gazı emisyonları günümüzün enerji sektörü için her geçen gün daha büyük zorluk haline gelmektedir. Artan nüfus ve kentleşme nedeniyle elektrik talebi katlanarak artış göstermektedir. Bu koşullar altında, enerji üretimi için çevre dostu enerji kaynaklarının benimsenmesi son derece önemlidir.

Günümüz dünyasında küreselleşmenin de etkisiyle geleneksel kalkınma anlayışından sürdürülebilir kalkınma anlayışına doğru bir geçiş yaşandığını ifade edebiliriz. Sürdürülebilir kalkınmayı gerçekleştirebilmek amacıyla yenilenebilir enerji, hem sanayi alanında hem de yerel uygulamalardaki enerji ihtiyacını karşılamada önemli rol üstlenebilir.

Enerji kaynakları olarak; rüzgar enerjisi, dalga enerjisi, hidrojen enerjisi ve hidrolik enerji, jeotermal enerji, güneş enerjisi ve füzyon enerjisi gibi enerji türleri yenilenebilir enerji kaynaklarına örnek verilebilir. Bunun yanında en hızlı biçimde gelişen ve ülkelerin sürdürülebilir kalkınmasını destekleme de daha fazla katkı sunan yenilenebilir enerji kaynaklarından güneş ve rüzgar enerjisi en popüler enerji kaynakları olarak ifade edilmektedir.

Özellikle son yıllarda Güneş enerjisinden elektrik enerjisi elde etme alanında yenilenebilir enerji kaynakları ile enerji üretimi çok büyük önem kazanmıştır. Yenilenebilir enerji kaynaklarının, mümkün olan en yüksek düzeyde kullanımını bir tercih olmaktan çıkıp bir zorunluluk haline geldiği herkesçe kabul edilen bir gerçektir.

Ülkemiz, coğrafi konumu nedeniyle sahip olduğu güneş enerjisi potansiyeli açısından birçok ülkeye göre şanslı durumdadır. Devlet Meteoroloji İşleri Genel Müdürlüğünde'nden alınan bilgilere göre (DMİ) 1985-2019 yılları arasında Türkiye ortalama günlük güneşlenme süresi 6,8 Saat [1], 2011-2019 yılları arasında Türkiye ortalama güneş radyasyonu 1558,7 kwsaat/m² [2]. Türkiye güneş enerjisi potansiyeli atlası şekil-1'de verilmiştir. Güney Doğu Anadolu Bölgesi Türkiye'nin en fazla güneş enerjisi alan bölgesi olup, bunu Akdeniz Bölgesi takip etmektedir.



Şekil-1:Türkiye güneş enerjisi potansiyeli Atlası(GEPA) [3]

MATERYAL VE METOT

Bu çalışmada Doğu Anadolu Bölgesi'nde bulunan Elazığ ili Şahinkaya Mevkiinde kurulu olan bir güneş enerji santralinin 2018 Ocak-2019 Aralık ayı arasındaki 24 aylık aylık üretim verilerinin Meteorolojik verilere (Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²)) bağlı olarak tahmini yapılmıştır. GES' e ait üretim bilgileri GES 'ten alınmıştır. Meteorolojik veriler ise T.C. Meteoroloji Genel Müdürlüğü Meteorolojik Veri Bilgi Sunum ve Satış Sistemi (MEVBİS)'ten alınmıştır. Çalışmada uygulanacak model Yapay sinir ağları (YSA)'nın MATLAB (R2018 Sürümü) yazılımı ile gerçekleştirilmiştir.

Güneş enerji santrali Elazığ il merkezinde bulunmaktadır. EPDK tarafından üretim lisansı verilen proje Türkiye'de ilk lisans alınan güneş enerjisine dayalı elektrik üretim projesi olma özelliğine sahiptir. 8MW kurulu gücüne sahip GES 28776 güneş panelinden oluşmaktadır. Santral Elazığ-3 TM 154 kV barası üzerinden TEİAŞ sistemine bağlanmıştır. Tesis 14.10.2016 tarihinde işletmeye açılmıştır. GES'e ait fotoğraf Şekil-2'de verilmiştir.

Şekil-2: Güneş Enerji Santrali

Yapay sinir ağları, özellikle bilgi teknolojilerinin gelişmesiyle beraber mühendislik alanında çok geniş bir uygulama alanı bulmuştur. YSA, biyolojik nöron hücresinin yapısı ve öğrenme karakteristiklerinden esinlenerek geliştirilen bir hesaplama sistemi olarak tanımlanmaktadır [4-5]. Öğrenme işlemini örnekler yardımı ile gerçekleştirirler [6]. YSA makine öğrenmesinde yaygın olarak kullanılan bir modeldir. İnsan beyninin yapısından esinlenilerek tasarlanan, örüntü tanıma ve hata minimizasyonuna dayalı bir yöntemdir. Biyolojik sinir ağlarının temel özelliklerini içeren en basit yapay nöron modeli,1943 yılında McCulloch ve Pitts tarafından geliştirilen *treshold logic units* modelidir.1958 yılında Rosenblatt tarafından geliştirilen Perceptron modeli ise *treshold logic units* modeline, Hebb öğrenme modelinin uyarlanması ile geliştirilen öğrenen bir yapay sinir ağı modelidir.1980'li yıllarda geliştirilmiş olan çok katmanlı perceptron modeli,özellikle geri yayılım öğrenme algoritması kullanılarak sınıflandırma problemlerinin çözümünde başarı sağlamış ve YSA alanında yeni bir dönemin başlangıcını oluşturmuştur [7].

Bu çalışmada GES'e ait üretim değerleri, Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²) toplam 730 satır veri Excel paket programına kaydedilmiştir. Daha sonra tüm veriler [0,1] arasında Min – Max normalizasyon yöntemi kullanılarak ölçeklendirilmiştir [8]. Normalizasyon, YSA modelinin ağ girişi ve çıkışlarına bazı ön işleme adımlarının uygulanmasıyla, YSA'ya sunulan verilerin daha verimli hale getirilmesi işlemini ifade etmektedir. Kaydedilen bazı veriler ve normalizasyon işlemi sonucunda elde edilen bazı veriler Tablo-1'de verilmiştir.

Tablo-1: Santrale ait bazi Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²) verileri ve normalize edilmiş veriler

Tarih	Üretim	Günlük Ort.sıcaklik	Günlük Toplam Global güneş rad.	Günlük ortalama Nispi Nem	Günlük ort.sıcaklik Norm.	Günlük Toplam Global Güneş Rad.Norm	Günlük Ortalama Nispi Nem Norm.	Üretim Norm.
	MWH	°C	kwsaat÷m²	%	°C	kwsaat÷m²	%	MWH
01.Oca.18	9	6,4	0,8	83	0,297003	0,082353	0,831933	0,140901
2.Oca.18	39	4,6	2,6	60,2	-0,75204	0,294118	0,558223	0,619647
3.Oca.18	31	2,5	2,3	71,2	0,06812	0,258824	0,690276	0,488139
4.Oca.18	7	4,9	0,6	75,4	-0,86649	0,058824	0,740696	0,115427
5.Oca.18	18	5	0,3	78,4	0,135497	0,023529	0,776711	0,288648
6.Oca.18	41	5,3	2,7	70,5	0,144414	0,305882	0,681873	0,644802
7.Oca.18	43	4,3	2,9	70,3	0,117166	0,329412	0,679472	0,677918
8.Oca.18	43	3,1	2,8	72,1	0,084469	0,317647	0,70108	0,683331
9.Oca.18	39	2,7	2,7	71,1	0,073569	0,305882	0,689076	0,628085
10.Oca.18	32	4,1	2,9	56,6	0,111717	0,329412	0,515006	0,50406
1.Ara.19	4	9,5	0,5	90	0,258856	0,047059	0,915966	0,063684
2.Ara.19	23	6,9	1,6	80	0,188011	0,176471	0,795918	0,366184
3.Ara.19	35	3,7	2,7	64	0,100817	0,305882	0,603842	0,557236
4.Ara.19	21	2,8	1,8	77,8	0,076294	0,2	0,769508	0,334342
5.Ara.19	2	3,7	0,3	87,2	0,100817	0,023529	0,882353	0,031842
6.Ara.19	6	3,8	0,7	92,6	0,103542	0,070588	0,947179	0,095526
7.Ara.19	35	3,7	2,5	81,7	0,100817	0,282353	0,816327	0,557236
8.Ara.19	12	3,1	1,1	80	0,084469	0,117647	0,795918	0,191052
9.Ara.19	18	3,2	1,8	75	0,087193	0,2	0,735894	0,286579

10.Ara.19	4	5,3	0,5	78,1	0,144414	0,047059	0,773109	0,063684

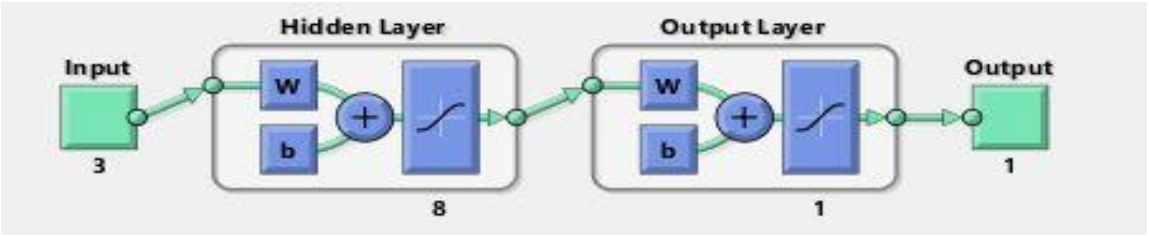
BULGULAR

Güneş enerjisi potansiyeli tahmini yapmak için YSA modelini oluşturduktan sonra eğitim ve test sürecine geçilmiştir. YSA modelinde girdi olarak üç tane meteorolojik parametre (Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²)) girilmiş GES'in üretim verileri tahmin edilmiştir.

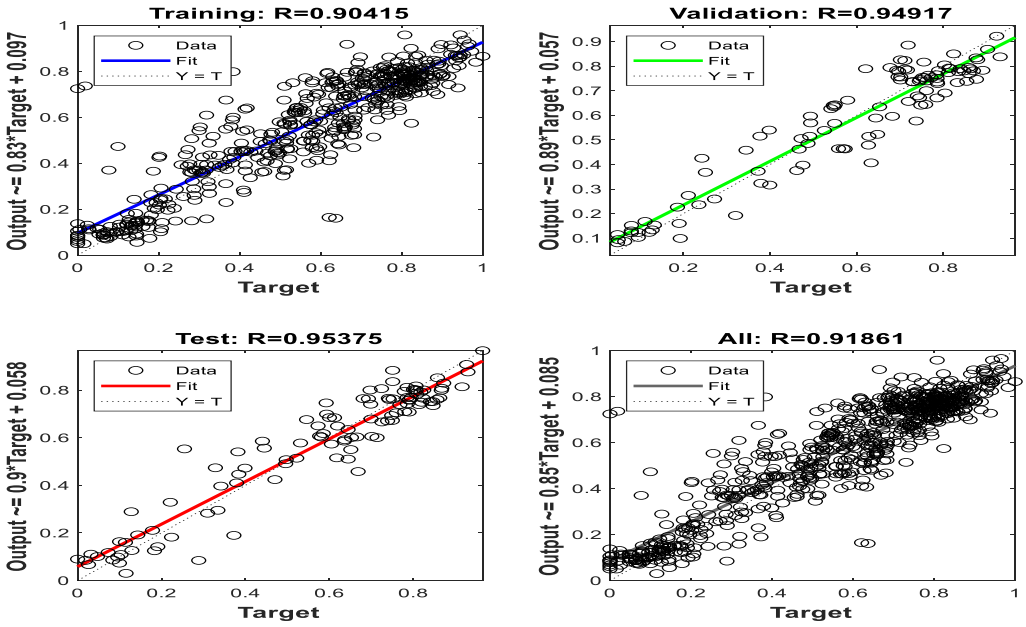
YSA parametreleri (eğitim fonksiyonu, gizli transfer fonksiyonu, gizli katmandaki nöron sayıları, çıktı fonksiyonu gibi) değiştirilerek pek çok model denenmiş ve en uygun model bulunmaya çalışılmıştır. İleri beslemeli geri yayılım (feed-forwardbackrop) algoritması, learngdm öğrenme fonksiyonu ve oluşturulan veri setlerinin eğitilmesi amacıyla Levenberg Marquand (trainlm) eğitim algoritması, aktivasyon fonksiyonu olarakta tanjant sigmoid fonksiyonu (tansig) kullanılarak YSA modeli dizayn edilmiştir. Tasarlanan YSA modeli 1000 iterasyon yapılarak eğitilmiştir. "0" hata 1e-7 gradient değeri kullanılmıştır. Dizayn edilen model Şekil-3'te verilmiştir.

Elde edilen sonuçların değerlendirilmesinde iki adet değerlendirme indeksi kullanılmıştır. Bunlar; Ortalama Hata Karesi (MSE) ve elde edilen tahmin değerleri ile gerçekleşen üretim değerleri arasındaki ilişkiyi veren Korelasyon Katsayısı (R)'dır [9].

Modelleme performans gösteriminde gerçekte olması gerekli çıkışla YSA çıkışının karşılaştırılması sonucu test eğitim ve doğrulama verileriyle birlikte tüm data sonuçlarının regresyon eğrileri Şekil-4'te verilmektedir. Sonuçlara bakıldığında, bütün veriler için regresyon değerlerinin 1'e yakın olduğu görülmektedir. YSA model çıkış değerlerinin gerçek verilere çok yakın değerler olduğu tespit edilmiştir. Önerilen modelin performansı yani Ortalama Hata Karesi (MSE) değeri 0.00908 bulunmuştur.



Şekil-3:Tasarlanan YSA Modeli



Şekil-4: Test, Eğitim ve Doğrulama Verilerinin ve Tüm Datanın Sonuçlarına ait Regresyon Eğrileri

Bu süreçler sonucunda elde edilen eğitilmiş YSA'nın performansını test etmek amacıyla Ocak 2018 yılına ait bazı üretim verileri ile YSA'nın ürettiği tahmin verileri karşılaştırılarak Tablo 2'de verilmiştir.

Tablo-2:Santrale ait bazı üretim değerleri ve YSA tarafından tahmin edilen değerler

Tarih	Üretim Norm.	YSA Tahmini Normalize
01.01.2018	0,14090113	0,10710588
02.01.2018	0,619646553	0,65391958
03.01.2018	0,488138831	0,40894876
04.01.2018	0,11542748	0,10214875
05.01.2018	0,288648304	0,0985242
06.01.2018	0,644801783	0,47253841
07.01.2018	0,677917529	0,52993253
08.01.2018	0,68333068	0,52043956
09.01.2018	0,6280847	0,50396666
10.01.2018	0,504059863	0,53902169

SONUÇLAR VE TARTIŞMA

Bu çalışmada Elazığ ili Şahinkaya Mevkiinde bulunan 8 MW Kurulu gücü olan güneş enerji santralinin üretim değerleri tahmin edilmeye çalışılmıştır. Güneş enerjisi potansiyeli tahmini yapmak için YSA modeli tasarlandıktan sonra eğitim ve test aşamasına geçilmiştir. YSA modelinde girdi olarak üç tane meteorolojik parametre (Günlük Ortalama Nispi Nem (%),Günlük Ortalama Sıcaklık (°C), Günlük Toplam Global Güneş Radyasyonu (kwsaat÷m²)) kullanılarak GES'in üretim verileri tahmin edilmiştir. Test sonuçlarına bakıldığında, modelin yaptığı tahminlerin güvenilir ve tutarlı olduğu tespit

edilmiştir. Gerçekte olması gereken çıkışla YSA çıkışının karşılaştırılması sonucu test, eğitim ve doğrulama verileriyle birlikte tüm datanın sonuçlarının regresyon değerleri 1'e yakın çıkmıştır. Bu değerlerin 1'e yakın çıkması tasarlanan modelin başarılı olduğunu göstermektedir. Farklı jeolojik konumda bulunan santrallerin veya diğer enerji türündeki santrallerin üretim verileri aynı yöntemle hesaplanabilir.

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FIREBASE AND MYSQL PERFORMANCES FOR DATA EXCHANGING WITH CSV FILE IN PHP-BASED WEBSITE

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Abstract – as world growing with technology and revolution to computerized the information get massive that become data; those data need to be collected somewhere as can be called a database, by classifying the database into SQL (structure query language) that's related to relational databases and NoSQL that belongs to not relational databases or distributed database. Generally, many of research declare about the comparison between SQL among the NoSQL database, this paper goes further to compare Firebase which is a NoSQL database with phpMyAdmin (MySQL) which is a SQL database in exchanging data with CSV file for php-based website. The experimental result where collected for two CSV file of 1000 and 4997 number of records for both importing and exporting process. this paper concludes that MySQL is quicker than Firebase in dealing with websites.
Keywords: SQL, NoSQL, Firebase, MySQL, CSV, Website.

I. INTRODUCTION

An organized data collection which is stored and accessed by a computer system usually called a database (Ullman 2007). In massive range and the highly diverse and complex existence of data, today's digital systems are responsible for big-dimensional data. Also, a large volume of data needs to be stored, handled or analyzed in cloud systems and social media systems (Ramzan and Bajwa 2018). The most growing and conventional approach to database solutions is SQL or Relational Database Management Systems. The data are stored in tables or relationships in an organized way (Binani, Gutti, and Upadhyay 2016). The NoSQL databases are applications that enable large-scale data storage through decentralized servers both in enterprise and open source database management. NoSQL cares SQL, and thus NoSQL is redefined as "Not Just SQL" to prevent the lack of understanding that SQL cannot be included (Ganesh Chandra 2015). horizontal scaling can be allowed by NoSQL, that's many implementations are stored continuously on separate servers. The column-based NoSQL database holds data in a large table rather than multiple tables in the relational data database to accommodate such an auto-scaling feature (Lee and Zheng 2015). Firebase is a NoSQL database that is hosted in the cloud. synchronization occurs between connected devices and is obtainable when local cache network connectionless. This is a database powered by events that function very differently from standard SQL database (Moroney and Moroney 2017a). The MySQL presented in PHP and it simply allows object-oriented programming in PHP without including additional libraries (Stephens and Russell 2004). PHP is a one of popular web development scripting language, in 1994 was created by Danish-Canadian programmer Rasmus Lerdorf, Php 7 is last improved version (Jentsch 1997). This paper compared firebase performance with MySQL in exchanging (importing and exporting) of data with a CSV file using a Php based website.

II. MATERIALS

A. Programming Hypertext Protocol (PHP)

Web pages mostly implemented with dynamic programming language called Programming Hypertext Protocol (PHP), it used in wide range of websites and web application which continually updated that makes it most common languages (Mon et al. 2019). The PHP code can be adapted to work with different web scripting languages to get and store data using various platforms. PHP languages uses functions to read and write data in Comma Separated Value (CSV) file (Mon et al. 2019).

CSV file are widely used in transferring huge amounts of data among none connected application. Mostly Microsoft Excel or Text pad used to edit the CSV files as spreadsheet fields separated by commas while the CSV records separated using system end of line characters (Hapeez, Yassin, and Hamzah 2010).

B. Structured Query Language (SQL)

The core programming language to handle data contained in baseline structures is the Structured Query Language (SQL). Though SQL was initially only implemented with Relational Database Management System (RDBMS), it has been extended considerably with the addition of new forms of databases (Silva, Almeida, and Queiroz 2016). SQL is the standard query language for relational database systems, including MySQL which is an open source RDBMS. It involves server and client (Wang 2018). While client is connected to server the users will be able to use SQL Data definition language (DDL) and Data manipulation language (DML) commands in the database (Wang 2018). MySQL has been used in various applications, for providing standard database system services MySQL joint with PHP to designing the backbone of most data management and online commerce Websites (Wang 2018).

C. NoSQL

NoSQL is unlike an RDBM (Relational Database Management System). NoSQL is an un-relational database serving a simple query language beyond a specified structure. NoSQL is a massively vast database that can distribute and reproduce data in a less controller environment universally. This database preserves the storing of data without any link. There is a hierarchical framework of NoSQL databases. It might also accommodate the data at top speed in a very rise volume. The NoSQL database is horizontally structured. Only several NoSQL database instances include Cassandra, HBase, Couchbase, Cosmos DB, Firebase, etc.

Firebase is a NoSQL cloud-based Realtime Database that synchronize data over clients in Realtime, and offline functionalities provided and Data is stored as a JavaScript Object Notation (JSON), thus all connected clients share one instance, new data automatically received through updates(Moroney and Moroney 2017b). Generally, firebase designed for mobile based application and web applications. this paper adapt firebase to work with PHP based website, this is needed for systems which requires both website and web-application to allow desktop and mobile clients to manage data simultaneously.

D. Criteria

Generally, SQL and NoSQL Database are compared in various criteria such as diversity, scalability, price, amount of data, accessibility, execution time, complexity, implementation, uniformity, security as shown in Table 1.

Table 1. comparison between SQL and NoSQL criteria

Criteria	**Relational Database (SQL)**	**NoSQL**
diversity	Open and closed source	Open-source
Scalability	Upgrade a single server with devices	Using standard servers scale horizontally
price	Costly data access solution	inexpensive than open source and cheaper update
Amount of data	Limited	Vast data hold
accessibility	Affect by single fail	Unaffected by one point of failure that’s distributed
Execution time	Long process time	Short process time
Complexity	Complex data creation	Less complex data creation
implementation	Small improvement occurs	Each stage own improvement occurs
uniformity	Structured	Unstructured
Security	Strong Security	Security not included is related to other parts

Generally, there are many Relational database and Non-Relational database, SQL can be categories as MySQL, Oracle, Microsoft SQL Server, PostgreSQL and DB2, While NoSQL can categories as follow Redis, Amazon DynamoDB, Cassandra, Scylla, HBase, Firebase, MongoDB, Couchbase, Neo4j, Datastax Enterprise Graph, Elasticsearch, Splunk, Solr as shown in figure 1.

Figure 1. Categories of SQL & NoSQL

Table 2. Comparison between Firebase and MySQL Criteria (DB-Engines.com 2020).

Criteria	**Firebase**	**MySQL**
Type	Cloud hosted Realtime	Open source RDBMS
Database Model	Document Store	RDBMS and Document Store
Develop by	Google company	Oracle company
Release	2012	1995
Commercial	Yes	No
Cloud based	Yes	No
Server OS	Hosted	FreeBSD Linux OS X Solaris Windows
Scheme of Data	Free schema	Yes
XML support	No	Yes
SQL	No	Yes
Access methods and API's	Android iOS JavaScript API RESTful HTTP API	ADO.NET JDBC ODBC Proprietary native API
Support program language	Java JavaScript Objective-C	Perl PHP Python Ruby C C# C++ Java JavaScript (Node.js) Objective-C And others
Server-side scripts	Functionality are limited with rules	proprietary syntax
Triggers	When data changes callbacks are triggered	Yes
Consistency	Eventual at offline immediate at online	Immediate consistency
Foreign keys	No	Yes

Integrity	Yes	ACID
Authentication	Authentication based and database rules	No user groups or roles

Table 2, shows features comparison between firebase that belongs to NoSQL database and MySQL that belongs to SQL database.

III. PROPOSED METHODS

In this section shows, the proposed procedure for reading csv file and import data to firebase and phpMyAdmin Database, vice versa exporting data from firebase and phpMyAdmin. The execution time measured to compare the efficiency of using firebase and MySQL in importing and exporting php-based website data.

A. Php and CSV file

PHP for reading and writing data from and to CSV file the following functions needs:

i. Fopen function

This function is used for opening CSV file

fopen (*file*, *mode*)

where, file represent the target file, and mode is access needed for reading or writing in CSV file.

ii. Fgetcsv function

This function is used for reading data from CSV file with line by line parsing an open file and checking for data fields.

fgetcsv (*file*, *length*, *separator*)

where, file represent the target file, length represent the maximum length in CSV row, and separator is comma separate CSV fields.

iii. Fputcsv function

This function is used for writing data to CSV file

fputcsv (*file*, *fields*)

where, file represent the target file, fields represent the data array.

iv. Fclose Function

This function is used for opening CSV file

fclose (*file*)

where, file represent the target file.

B. PHP and Firebase

Firebase is a Realtime and a cloud storage database designed for Mobile and web applications, it can't be used directly with php for developing websites. Firebase store data as JSON, then for connecting PHP with Firebase Composer dependency manager is needed

, which is a tool that offers a standard format for handling dependencies of PHP and libraries.

PHP need the following functions to read/write data from firebase database:

i. Getreference function

this function used to refence the source database needs to push and get value from its data.

getreference (*DB*)

where, DB represent the target Database.

ii. Push function

This function is used to insert a list of data in the firebase database. Firebase database create new unique key when pushing new node into the list of data.

Push (*Data*)

where, Data represent the list of data to be pushed in Database.

iii. getValue function

This function is used to retrieve a data from the firebase database.

```
getValue ()
```

C. PHP and phpMyAdmin

PHP need the following SQL statement to read/write data from phpMyAdmin database:

i. Insert Statement

This statement is used to insert a data in the phpMyAdmin database.

```
INSERT INTO table_name (column, ...)
VALUES (value, ...)
```

where, table_name represents the target table to insert data, column represents column names in the table and value represents the data to be inserted in the table.

ii. Select Statement

This statement is used to select a data from the phpMyAdmin database.

```
SELECT * FROM table_name
```

where, table_name represents the target table to select data from database and * is represent all columns in the table.

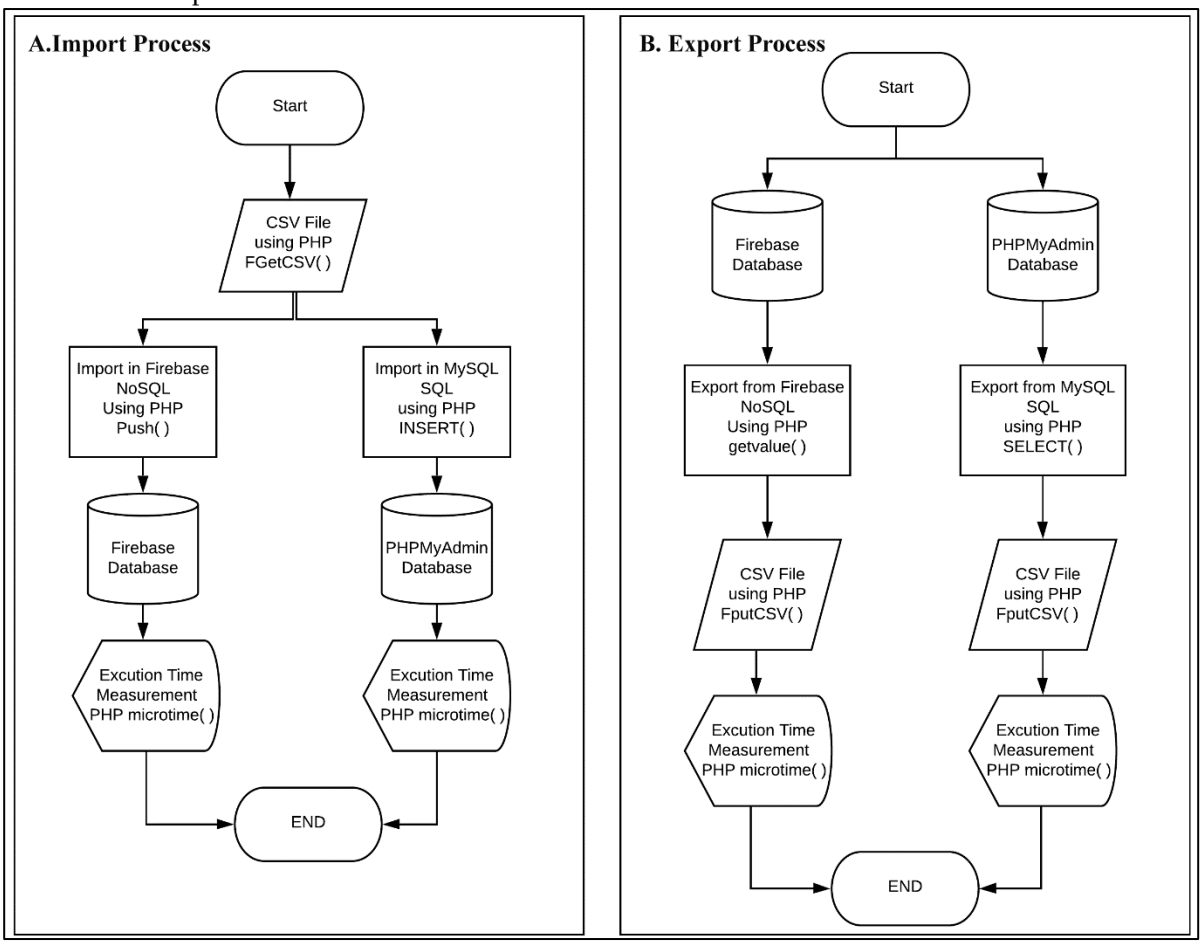


Figure 2. import and export process

Figure 2 shows the procedure of import and export data for both firebase and phpMyAdmin database.

IV. Experiment and Result

This section shows the experiment of import and export data from firebase and phpMyAdmin database with performance result with internet speed with 6 ping ms that download 34.65 Mbps and upload 36.06 Mbps.
In the experiment the two CSV file used that belong to a hospital, the first CSV file contains 1000 records while the second CSV file contains 4997 records, both files have 11 columns as shown in figure 3.

Hospital CSV file

- Country
- State
- County
- Lat
- Lng
- Type
- Measure
- Beds
- Year
- Source
- Population

Figure 3. CSV file columns name

Figure 4, shows the entire system connection that start by connection from pc to 000webhost server. The server hosts the website that connect to the following two different databases:

- phpMyAdmin: in the 000webhost using SQL
- Firebase: in Google server Using NoSQL

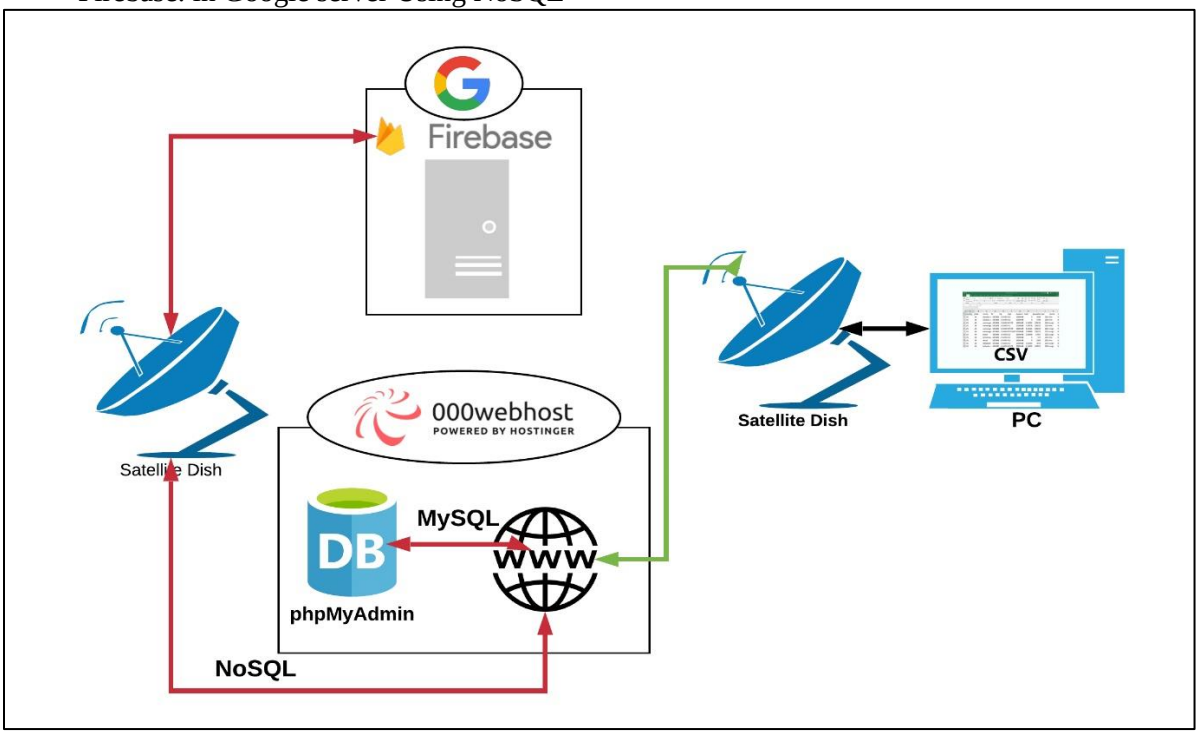
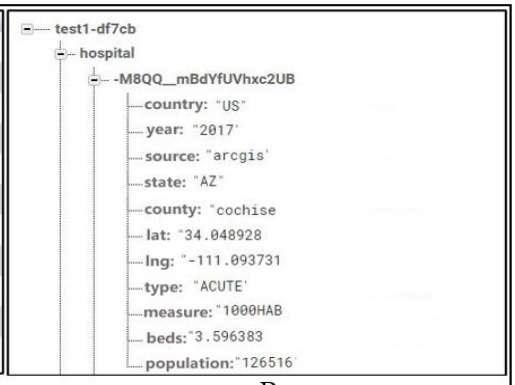


Figure 4. System connection

in phpMyAdmin and Firebase online database a table created according to CSV structure named hospital as shown in figure 5 (A) and (B).

#	Name	Type	Collation	Attributes	Null	Default
1	country	varchar(255)	utf8_unicode_ci		No	None
2	state	varchar(255)	utf8_unicode_ci		No	None
3	county	varchar(255)	utf8_unicode_ci		No	None
4	lat	float			No	None
5	lng	float			No	None
6	type	varchar(255)	utf8_unicode_ci		No	None
7	measure	varchar(255)	utf8_unicode_ci		No	None
8	beds	float			No	None
9	year	int(100)			No	None
10	source	varchar(255)	utf8_unicode_ci		No	None
11	population	int(100)			No	None

A



B

Figure 5. shows hospital table online database structure (A) phpMyAdmin (B) Firebase

The Execution time for importing ang exporting data in both databases are measured as shown in table 3.

Table 3. execution time of phpMyAdmin and Firebase

process	Record No.	phpMyAdmin	Firebase
import	1000	1.1398 seconds	138.649094 seconds
	4997	5.14542 seconds	735.564 seconds
export	1000	0.009865 seconds	0.495048046 seconds
	4997	0.053464 seconds	0.774774 seconds

Table 3 shows the execution time of importing and exporting for 1000 and 4997 records of CSV file in phpMyAdmin and firebase. the import and export process with 1000 records of CSV file execution time into phpMyAdmin and Firebase is shown in chart figure 7 while figure 8 shows the execution time of import and export the 4997 records of CSV file into phpMyAdmin and Firebase database.

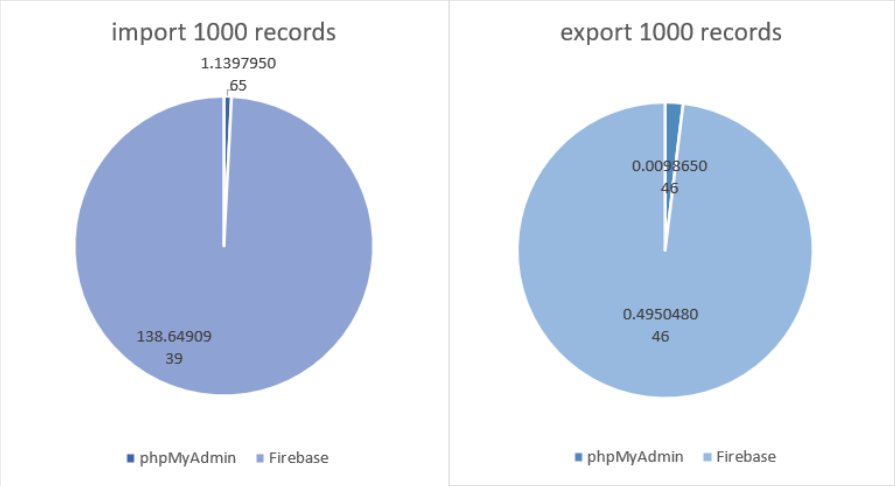


Figure 7. import and export 1000 records in phpMyAdmin and firebase

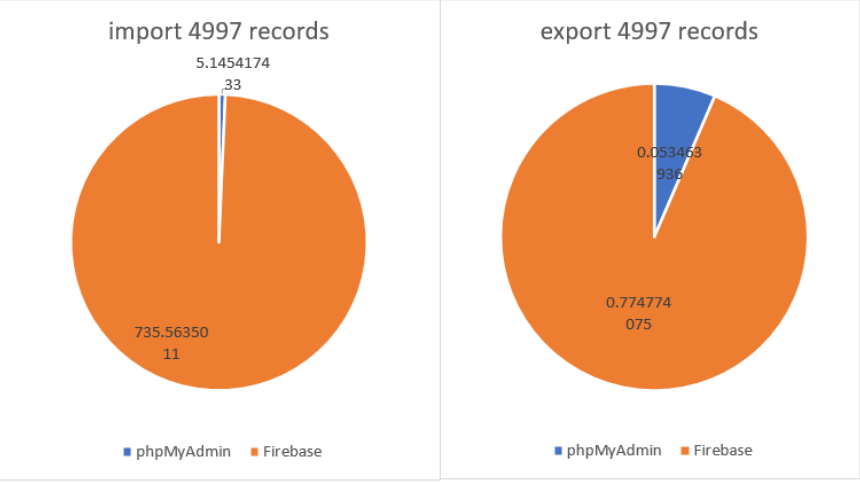


Figure 8. import and export 4997 records in phpMyAdmin and firebase

V. Conclusion

This paper present time performance evaluation for process of data exchanging (import and export) data between CSV file and online databases (MySQL and Firebase) with php-based website.

The experimental result where tested for two CSV files with 1000 and 4997 record number, it shows that the data importing and exporting process of MySQL is faster than Firebase in php-based website, this is because the

connection between website and phpMyAdmin are directly carried by MySQL in the same server, while the connection between website and firebase is not direct and require more time to reach database in external server.

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USING OF ADDITIVE (DIGITAL) COLOR SYSTEM INSTEAD OF SUBTRACTIVE (ANALOGUE) COLOR SYSTEM IN AN ONLINE WORLD

ÇEVRİMİÇİ BİR DÜNYADA ÇIKARIMSAL (ANALOG) RENK SİSTEMİ YERİNE TOPLAMSAL (DİJİTAL) RENK SİSTEMİ KULLANIMI

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Abstract

Color is the perception that occurs when light reaches the eye retina. Color perception varies due to the partial absorption and partial reflection of light when it hits the materials. If all the wavelengths of light reach the eye, it ise perceived as white and if the light cannot reach, it is perceived as black. Various color systems have been developed for use in application areas . Subtractive (Analogue) color system; Yellow, blue and red are the primary colors. When the primary colors are combined by changing the densities of one, two or three, all other colors are obtained. When three primary colors are combined on a white background, theoretically black color appears. The pigment-based subtractive color system forms the basis of the CMYK printing system. The Additive (Digital) color system; Green, blue and red as the primary color. When the primary colors are combined by changing the densities of one, two or three, all other colors are obtained. When the three primary colors are combined on a black background, theoretically white color appears. The light-based additive color system forms the basis of the RGB display system. Human first used pigment paints to simulate the colors they saw. In hunter-gathering societies, the information is conveyed by cave painting. Until the discovery of other communication tools, paper was the only method of voice and video communication and recording. Printing that prints on paper uses a pigment-based CMYK primary color system. With the development of display technologies, it was possible to simulate the color universe from light instead of pigment. The additive (digital) color system has a much wider color universe than the subtractive (analogue) color system. In color education, pigment dye-based subtractive (analogue) color system, in which yellow, red and blue are considered primary colors, is taken as basis. Smartphones, tablets and computers with screens are cyberspace devices. Today, many analog applications have been replaced by digital applications. For this reason, it may be important for an online world to start the education of the additive (digital) color system, which accepts green, blue and red as the primary color.

Key: Subtractive (Analogue) color system, Additive (Digital) color system, RGB, CMYK, Online, Covid-19

Özet

Işığın göz retinasına ulaşmasıyla ortaya çıkan algı; renktir. Renk algısı, ışığın maddeler üzerine çarptığında kısmen soğurulup kısmen yansıması nedeniyle çeşitlilik göstermektedir. Işığın tüm dalga boyları göze ulaşırsa beyaz, ışık ulaşamazsa siyah olarak algılanmaktadır. Uygulama alanlarında kullanılması için çeşitli renk sistemleri geliştirilmiştir. Çıkarımsal (Analog) renk sistemi, sarı, mavi ve

kırmızıyı ana renk olarak kabul etmektedir. Ana renkler birinin, ikisinin veya üçünün yoğunlukları değiştirilerek birleştirildiğinde diğer bütün renkler elde edilmektedir. Üç ana renk beyaz bir zeminde birleştirildiğinde teorik olarak siyah renk ortaya çıkmaktadır. Pigment temelli çıkarımsal renk sistemi CMYK baskı sisteminin temelini oluşturmaktadır. Toplamsal (Dijital) renk sistemi, Yeşil, mavi ve kırmızı ana renk olarak kabul etmektedir. Ana renkler birinin, ikisinin veya üçünün yoğunlukları değiştirilerek birleştirildiğinde diğer bütün renkler elde edilmektedir. Üç ana renk siyah bir zeminde birleştirildiğinde teorik olarak beyaz renk ortaya çıkmaktadır. Işık temelli toplamsal renk sistemi RGB ekran sisteminin temelini oluşturmaktadır. İnsanoğlu gördüğü renkleri simüle etmek için önce pigment boyaları kullanmıştır. Avcı toplayıcı topluluklarda bilgi duvar resmi yoluyla aktarılmıştır. Kağıt icadından yüzyıllar sonra diğer iletişim araçlarının keşfine kadar sesli ve görüntülü iletişimin ve kayıt etmenin tek yöntemi olmuştur. Kağıt üzerine baskı yapan matbaa ana renklerinin CMYK olduğu pigment temelli sistemi kullanmaktadır. Ekran teknolojilerini geliştirilmesi ile pigment yerine ışıktan renk evreni simüle edebilmek mümkün olmuştur. Toplamsal (dijital) renk sistemi, çıkarımsal (analog) renk sistemine göre çok daha geniş bir renk evrenine sahiptir. Renk eğitiminde sarı, kırmızı ve mavinin ana renk kabul edildiği pigment boya temelli çıkarımsal (analogue) renk sistemi esas alınmaktadır. Ekranlı akıllı telefonlar, tabletler ve bilgisayarlar siber uzay cihazlarıdır. Günümüzde bir çok analog uygulama yerini dijital uygulamaya bırakmaktadır. Bu nedenle yeşil, mavi ve kırmızıyı ana renk olarak kabul eden toplamsal (dijital) renk sisteminin eğitimine başlanması çevrimiçi bir dünya için önem arz edebilmektedir.

Anahtar: Çıkarımsal (Analog) renk sistemi, Toplamsal (Dijital) renk sistemi, RGB, CMYK, Çevrimiçi, Covid-19

Visual Communication and Color

Communication is a set of interactions that connects people from the beginning of the history of humanity to the present and from today to eternity and ensures their agreement in balance and harmony as a social group (Mısırlı, 2013, p: 1). Being a biological entity, man is also a member of the society he lives in. It is surrounded by human communication networks and communication activities in the society (Bahar, 2016, p: 1). In the pre-invention of writing, it was inferred from the findings that information was transferred through wall painting in hunter-gatherer societies. (Meggs, 2011, p.6). The ability to establish audio and visual communication has socialized and civilized human beings. The whole set of rules brought about by the transition from hunter-gatherer society to settled society left the audio and visual communication inadequate at one point, making it obligatory to find text and therefore to record these rules. The invention of writing is also the beginning of the history of civilization. Writing gave birth to the book with it. When the manuscript could not keep up with the speed of communication, printing was found as a faster, easier and cheaper method. Until the last century, the printing was the only method for both recording and communication. The equivalent of the CMYK color system used in printing has been the RGB color system of screen technologies in the new century. Although both systems have superior aspects to each other, pigment dye-based color system is taught from childhood, while education on light-based color system is not provided. The printing has had an important place in the development of our color perception today, when its mission for centuries has begun to leave online. For this reason, color has been handled over the printing.

Paper and Screen

Although it is dated to 105 AD according to the Chinese Dynasty records, this date is somewhat doubtful. This invention is a gradual process like most inventions. Until the end of the Chou Dynasty until the end of the classical period of China (256 A.D.), it was written with a pencil on the surface made of bamboo or wood. The tree was used for short texts, bamboo for longer spellings and books (Goodrich, 1955, p.3). Unlike the tablet, parchment and papyrus, it enabled the production of the paper

book. The book played an important role in spreading knowledge. Until the discovery of other methods of communication centuries later, paper was the only method of audio and video communication and recording. With the invention of paper, literature, mathematics, art, law and history developed. It has been the place where today's information such as internet, satellite, radio, TV networks are spread and recorded. Nowadays, many recording equipment such as hard disks, DVDs, CDs, cassettes, micro films are required to record and deliver information. Paper is unique in that it can both carry and store messages. Therefore, documents printed with paper can be read without the need for any additional equipment. However, in information communication, books, magazines and newspapers have left their places to digital competitors or are beginning to leave their places just as vinyl, casette and cd have been replaced by digital. Turkey still has value even though the decline in paper consumption, for example, a separate recording device does not need to be read for the presence of printed media will continue for a while longer. Cellulose and Paper Industry Foundation data for the 5-year period between 2013-2017 are important for paper consumption habits. In line with these data, the production of newspaper paper ended as 836 tons in 2013, it was not produced until this date, and its import decreased from 435,000 tons to approximately 225,000 tons and shows a decrease of approximately 50%. Writing-tabular paper production remained around 250,000 tons on the 5-year average and did not decrease or increase, again, imports remained almost constant with an annual average of 970,000 tons. While this decline and increase in communication-related newspapers and printing papers draws attention, the packaging group wrapping, corrugated cardboard and cardboard production, import and export are increasing. Likewise, although the production in the cleaning and cigarette papers of the consumption group remained constant on the cigarette side, the increase in imports decreased by half, in the cleaning group, production increased by almost 50%, imports decreased by 50% and exports increased by approximately 50% (SKSV, 2017) Based on these tables, while there is an increase in the use of papers to be included in the consumption group, there is a decrease in the side that can be called the communication group. In this case, it can be tired that people now obtain information from other digital channels. In the simulation of color, paper is beginning to leave its place to digital as the underprint material. Screen is the new paper.

Color

Color is the first element perceived by the brain. Form, symbols, words and other elements begin to be perceived much later (Becer, 2014, p: 110). The perception of light reaching the retina of the eye in different ways is color. Colors are simulated in printing with dye. In this case, the underprint material paper fulfills the task of light. One of the most important issues challenging printing technology is color. The reason for this is the formation and appearance systems of colors, which are actually a matter of physics. A certain part of all the color spectrum existing in nature can be passed on paper with the help of paint, some of them are called non-printable colors with four-color printing ink (Uçar, 2004, p.168). A very small part of the color universe formed by light can be expressed with CMYK. The human eye can perceive a very small part of the wavelength. The human eye perceives a very small portion of the wavelength. The RGB gamut simulates a restricted gamut, while the CMYK gamut simulates even less. The inability of printing to express color is not only pigment creation but also paper which is the reason for existence. Two theorems have been developed for colors; Pigment Originated Subtractive (Analogue) Color System and Light Source Additive (Digital) Color System.

Subtractive (Analogue) Color Synthesis: A subtractive color model explains the mixing of a limited set of dyes, inks, paint pigments or natural colorants to create a wider range of colors, each the result of partially or completely subtracting (that is, absorbing) some wavelengths of light and not others. The color that a surface displays depends on which parts of the visible spectrum are not absorbed and therefore remain visible. Subtractive color systems start with light, presumably white light. Colored inks, paints, or filters between the watchers and the light source or reflective surface subtract wavelengths from the light, giving it color. If the incident light is other than white, our visual mechanisms are able to compensate well, but not perfectly, often giving a flawed impression of the

"true" color of the surface. The subtractive color system does not have the light that makes the color. The image is taken white color from the paper on which is applied. For this reason it has a limited reality. CMYK (Fig. 1) is a model that offers four basic colors using colorants (dyes, inks or dye pigments). The system is used in the printing industry and by artists who combine paints to paint on canvas. The basic colors (pigments) that make this model are Cyan (C), Magenta (M), Yellow (Y) and Black (K), for short: CMYK. The letter K represents black instead of the letter B because B is already taken to represent Blue in the RGB system. Some theories suggest that K actually represents the word 'Key' (Key). Key means outline, that is the border around text and images. These borders are usually printed in black. In the printing industry, it was often easier to start printing borders before printing full colors. So, black is the "key" color. Here, if we mix equal amounts of CMY pigments, we end up with the color black because each color absorbs the light of the other (poeticmind).

Figure 1: Subtractive (Analogue) Color CMYK

Additive (Digital) Color Synthesis: Additive color is a method to create color by mixing a number of different light colors, with shades of red, green, and blue (Fig 2) being the most common primary colors used in additive color system. The combination of two of the standard three additive primary colors in equal proportions produces an additive secondary color—cyan, magenta or yellow—which, in the form of dyes or pigments, are the standard primary colors in subtractive color systems. The subtractive system using primaries that are the secondaries of the additive system can be viewed as an alternative approach to reproducing a wide range of colors by controlling the relative amounts of red, green, and blue light that reach the eye. Computer monitors and televisions are the most common examples of additive color. Examination with a sufficiently powerful magnifying lens will reveal that each pixel in CRT, LCD and most other types of color video displays is composed of red, green and blue sub-pixels, the light from which combines in various proportions to produce all the other colors as well as white and shades of gray. The colored sub-pixels do not overlap on the screen, but when viewed from a normal distance they overlap and blend on the eye's retina, producing the same result as external superimposition.

Conversely, additive color systems start with darkness. Light sources of various wavelengths are added in various proportions to produce a range of colors. Usually, three primary colors are combined to stimulate humans' trichromatic color vision, sensed by the three types of cone cells in the eye, giving an apparently full range.

Figure 2: Additive (Digital) Color RGB

While a wide range of colors can be created with combinations of cyan, magenta, yellow and black ink, there is a limit to the colors that CMYK can produce. The range of perception of the human eye is even greater than that of a large gamut screen. However, the total gamut (Fig 3) of process inks is large enough to be visible to the human eye, even within the range that the screen can show. As a result, images that are highly vibrant on the monitor become disappointingly dull. This is due to the limitations of the printing ink spectrum. The large circle in Figure 3 is an approximation of the range of colors perceived by the human eye. The yellow triangle line corresponds to the range of colors that can be displayed on RGB (red-green-blue) screens. The even smaller blue triangle shows the approximate gamut of CMYK inks. CMYK block does not evolve completely to RGB gamut (McCue, 2007, p.35). Thus, RGB and CMYK can never correspond.

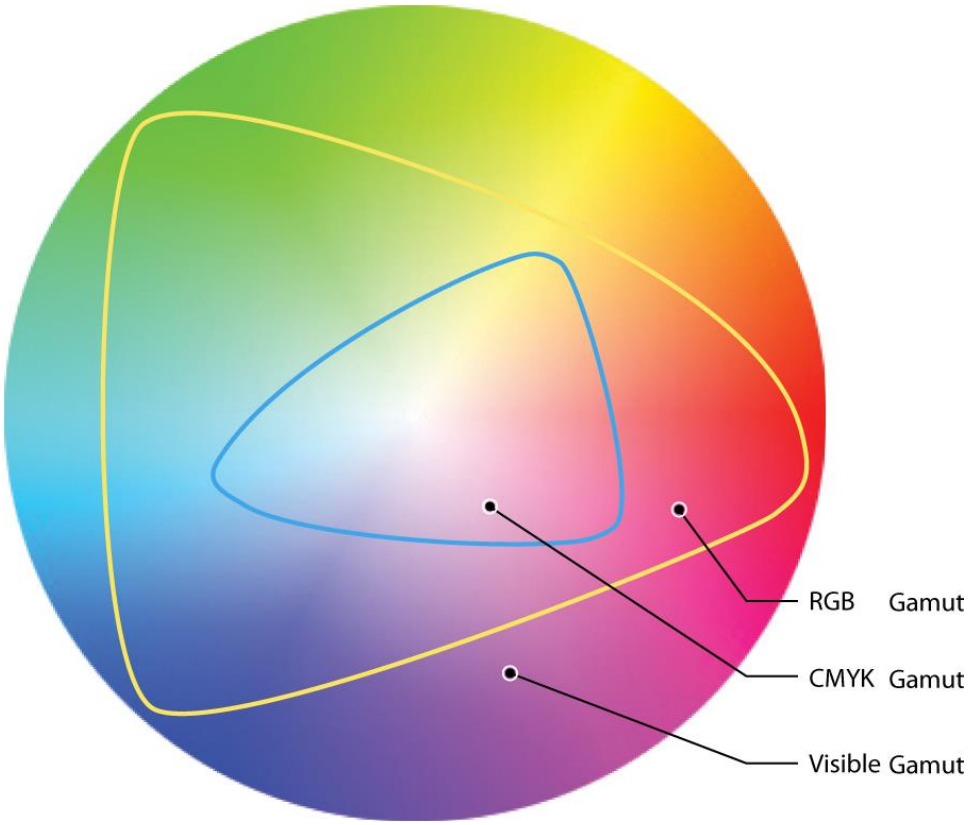

Figure 3: Gamuts

Result

From our infancy we learn the analog color system. It is simple, easy and fun to produce colors by mixing the colors. But nowadays, even when there are tablets in the hands of babies, is it just right to teach to new generations that only the main colors are red, blue and yellow? Rapidly evolving "screen" technology has been added to the additive color system as well as the inferential color system used by mankind from the beginning. The pigment based Subtractive (Analogue) Color Synthesis system that accepts red, blue, and cyan primary colors is insufficient for the screen. However, the future will be on the "screen". For instance, while we all learned that orange color was obtained in a blend of yellow and red dyes. Knowing that a 100% red (R) and 100% green (G) blend will create an olive greenery is a challenge even for a predictive graphic designer. For someone who has taken all his education according to the additive color system, a clear green result without adding yellow is also confusing at the same time. Especially with the effect of the Covid-19 pandemic, many businesses have turned into online today. While there were areas where printed documents were not used before, it can be foreseen that many documents that require contact may turn online from now on. It is certain that a more digital world awaits us. Therefore, it is important to learn and start teaching the additive color system, which is the color system of this new world.

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