The 3rd International Conference on Mathematics, Statistics & Information Technology (3rd ICMSIT 2022) Tanta, Egypt 20-22 Dec. 2022

Organized by

Faculty of Science – Tanta University

Under the Auspices

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Minister of Higher Education

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د/ عبد الفتاح العتيق	د/ خالد المرابع	أ/ شفاء مصطفى
د/ السيد عبد العال	د/ أسامة أمباني	أ/ أمينة خفاجى
د/ مجدي الطنطاوي	د/ أحمد العيسوي	
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	أ/ أحمد جميعى	أ.د/ فاطمة سلامة
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د/ السيد عبد العال	أ/ حسناء الأشقر	
د/ حنان حمدي	أ/ آلاء عادل	**لجنة الإعلام والطباعة**
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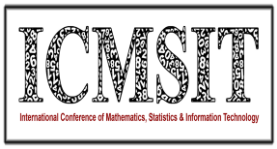
أ/ سلفانا طارق جرجس شفيق		أ/ هاجر
أ/ دعاء أبو شادى		أ/ ندا محمود ابواليزيد
أ/ أميرة عادل على غنيم		



Department of Mathematics

Faculty of Science, Tanta University

Egypt

Introduction

In 1969, the Faculty of Science, Tanta University was established, which consisted of six practical departments: Department of Mathematics, Department of Physics, Department of Chemistry, Department of Geology, Department of Botany and Department of Zoology. The Faculty of Science is committed to keep up its excellence in innovating and disseminating knowledge of basic and applied sciences. Upon this vision, the faculty will provide an environment where the students, teaching staff members and the faculty administration would cooperate with each other in the educational and research process; the matter that would open up an opportunity for them to work together as responsible and participants in the community development. Furthermore, the Faculty of Science, Tanta University, is committed to be distinguished in education through offering educational programs in basic sciences which would enable the student to acquire the basic and advanced knowledge and the skills required to make him confidently compete in the labor market as a professional or a well-prepared

alumnus. Moreover, the faculty aims at developing the competency of its teaching staff members so that they would be able to do high quality research in the basic and applied sciences which would help in solving the community problems on scientific and ethical basis.

Mathematics Department since its inception in 1969, it was serving the university colleges to provide staff members in all disciplines (Pure Mathematics, Applied Mathematics, Statistics and Computer Science). The vision of the Department of Mathematics is to raise the level of performance for achieving excellent outcomes in mathematics and its applications and to contribute to the enrichment of society and the development environment. Furthermore, the mission of the department is to prepare specialists qualified to compete in mathematics and its applications by offering distinct programs for the two phases of undergraduate and graduate to meet the development needs of the community, and enrich knowledge through education, training and scientific research. The Mathematics Department has 110 research faculty members and their assistants whose research covers a broad spectrum of mathematics and its applications. The total number of staff members is divided as follows: 19 Professor, 14 Assistant Professor, 45 Lecturer, 13 Assistant Lecturer, 18 Demonstrator in addition to 16 full-time professors in all fields of mathematics, statistics and computer science disciplines. Research areas covered include Algebraic Geometry and Number Theory, Complex Analysis, Numerical Analysis, Geometric Topology, Mathematical Physics, Quantum Mechanics and Nuclear Reactors, Applied Analysis, Computational Mathematics, Mathematical Modeling, Optimization, Control, Sensitivity Analysis, Partial

Differential Equations, Mathematical Fluid and Geophysical Fluid Dynamics, Stochastic Analysis, Mathematical Theory for Groundwater Research, Classical Mechanics, Statistics, Computer Sciences, Computational Stochastics, etc.. The Department also contributes to the university's general educational mission by teaching a large number of service courses as well as a lot of Master and Doctors of Philosophy in Science (Pure Mathematics, Applied Mathematics and Statistics) for the Egyptian and foreign student from the Arabic country.

Conference Aim

The aim of this conference is to bring together scientists and researchers from interdisciplinary mathematics fields ranging from pure and applied mathematics, probability, statistics, computer science, information technology and their applications.

Mathematical methods that developed in some areas can efficiently lead to the solutions of problems in other areas. During this event, the specialists are gathered from these different fields to share their experiences in solving problems in order to gain insight from other areas of research. Beside that to provide a clear idea about mathematical science and demonstrate its role to the society.

Scientific Committee

1-**Abdel-Aty M.,** Suhag University, Egypt.

2-**Awrejcewicz J.,** Lodz University of Technology, Poland.

3-**Balla M.,** Budapest University, Hungary.

4-**Banaś J.,** Rzeszow Technical University, Poland.

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9-**El-Kholy E**., Tanta University, Egypt.

10-**El-Namoury A.,** Tanta University, Egypt.

11-**El-Sayed A.,** Alexandria University, Egypt.

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13-**Gabr K.,** Tanta University, Egypt.

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20-**Lei L., Tokyo University, Tokyo, Japan.**

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27-**Ravi P. A.,** Texas A&M University, USA.

28-**Roman S.,** Poznan Univ. of Tech., Poland.

29-**Roy S.,** Vidyasagar University, India.

30-**Saker S.,** Mansoura University, Egypt.

31-**Shaker O.,** Tanta University, Egypt.

32-**Taha W.,** Halmstad University. Sweden.

33-**Tarabia A**., Damietta University, Egypt.

34-**Turgay S.,** Sakarya University, Turkey.

35-**Valero O.,** University of Balearic Islands, Spain.

36-**Younes A.,** Alexandria University, Egypt.

37-**Željko S.,** University of East Sarajevo, Sarajevo

Conference Topics

- Algebra
- Artificial intelligence
- Biostatistics
- Bioinformatics
- Biomathematics
- Computational Physics
- Computer and Information Sciences
- Differential Equations
- Differential Geometry
- Dynamical Systems
- Theoretical Mechanics
- Topology
- Financial Mathematics
- Fluid Mechanics and Elasticity
- Formal Concept Analysis
- Functional and Complex Analysis
- Graph Theory
- Industrial Mathematics
- Mathematical Engineering
- Mathematical Modeling
- Numerical Analysis
- Operations Research
- Probability Theory
- Quantum Theory
- Statistical Mechanics
- Statistics

Supporting Publication

Proceeding the previous conference are published as special issue in 'Mathematical Methods in the Applied Sciences'

Available online at

Website: http://icmsit22.tanta.edu.eg

E-mail: icmsit@science.tanta.edu.eg

Conference Programs

(Speakers - Sessions - Activities)

3rd ICMSIT22 Scientific Program: (Tuesday) 20 Dec. 2022, Tanta University-Conferences Center				
Time	**Chairman**	**Programs (Speakers- Activities-Sessions)**		**Place**
08:00-09:30	Recep. Team	**Reception and Registration**		Recep.
09:30-10:50	Organizers	**Opening Ceremony**		Conf. Hall
10:50-11:20	Prof. Abd El-Shfy Ebada Prof. E. El-Kholy	Invited speaker	**Prof. Aboul Ella Hassanein** Faculty of Computers & Artificial Intelligence Founder and Chair of the Scientific Research Group in Egypt- Cairo University **Digital Twinning and Artificial Intelligence: Recent trends and Applications**	Conf. Hall
11:20-12:00			**Prof. Elena A. Ivanova** Higher School of Theoretical Mechanics, Peter the Great St. Petersburg Polytechnic University Polytechnicheskaya, Russian Federation **Mechanics as The Method of Studying Nature**	
12:00-12:30	**Coffee Break & Prayer**			Rest. & Halls
12:30-13:00	Prof. Abd El-Shfy Ebada Prof. E. El-Kholy	Invited speaker	**Prof. Mahmoud Abdel-Aty** Sohag University, Egypt **New Aspects on Quantum Entanglement and Cybersecurity**	Conf. Hall
13:00-13:30			**Prof. Mohamed Asaad** Cairo University- Faculty of Science Department of Mathematics - Giza - Egypt **The Influence of Weakly Pronormal Subgroups on The Structure**	
13:30-14:00			**Prof. Ahmed M. A. El-Sayed** Faculty of Science, Alexandria University **Stability of Some Nonlinear Functional Equations and Applications**	

3rdICMSIT22 Scientific Program:(Tuesday)20 Dec. 2022, Tanta University-Conferences Center				
Time	**Chairman**	**Programs (Speakers- Activities-Sessions)**		**Place**
14:00-14:30	Prof. Mahmoud El-Burai Prof. Ahmed El-Namory	Invited speaker	**Prof. Haron M. Barakat** Faculty of Science, Tanta University **Asymptotic Behavior of Ordered Statistics and Record Values in a Mixture of Two Gaussian Sequences**	Conf. Hall
14:30-15:10			**Prof. Roman Starosta** Institute of Applied Mechanics, Poznan University of Technology, Poland **Multiple Scale Methods in Predicting Nonlinear Vibrations of Discrete Mechanical Systems**	
15:10-16:00	**Lunch Break & Prayer**			Rest. & Halls
16:00-16:30	Prof. Mahmoud El-Burai Prof. Ahmed El-Namory	Invited speaker	**Prof. Naser H. Sweilam** Mathematics Department, Faculty of Science, Cairo University, Giza, Egypt **Numerical Studies of Climate Change Models Under Piecewise Hybrid Fractional Derivative**	Conf. Hall
16:30-17:00			**Prof. Magd E. Kahil** Faculty of Engineering, MSA-University, Giza, Egypt **Bi-metric Types Theories of Gravity: The Problem of Motion**	
17:00-17:30			**Prof. Ahmed M. K. Tarabia** Department of Mathematics, faculty of science at Damietta University, Egypt **Explicit Solutions for Some Queueing Systems**	

3rd ICMSIT22 Scientific Program: (Wednesday) 21 Dec. 2022, Tanta University-Conferences Cente			
Time	**Chairman**	**Programs (Speakers- Activities-Sessions)**	**Place**
9:00-9:30	Prof. Abdelmonem Kozae (Invited speaker)	**Prof. Abdelmonem Kozae** Faculty of Science -Tanta University **Some Real-Life Applications of Generalized Topologies**	Hall (A)
9:30-11:30	Prof. Abdelmonem Kozae	**Closed Sessions (30 Researches)**	Halls
11:30-12:00	**Coffee Break & Prayer**		Rest. & Halls
12:00-12:30	Prof. Abdel Nasser Tawfik Prof. Abdelmonem Kozae	**Prof. Abdel Nasser Tawfik** Future University in Egypt (FUE), New Cairo, Egypt **Extensive or Nonextensive Statistics**	Conf. Hall
12:30-13:00	Invited speaker	**Prof. Maher Zayed** Faculty of Science - Benha University-Egypt **On Uniform Modules**	Conf. Hall Online
13:00-13:30		**Prof. Saeid Jafari** Mathematical and Physical Science Foundation, Denmark **1-Double Fuzzy rarely Continuous Functions.** **2- Is Quantum Gravity a Falsifiable Physical Theory?**	Conf. Hall
13:30-14:00		**Prof. Safiye Turgay** Faculty of Engineering Department of Industrial Engineering **Rough-Set-Based Decision Model and MCDM Applications for Incomplete Information Systems**	Conf. Hall Online
14:00-15:20		**Closed Sessions (20 Researches)**	Halls
15:20-16:10	**Lunch Break & Prayer**		Rest. & Halls

3rdICMSIT22 Scientific Program:(Wednesday)21Dec. 2022, Tanta University-Conferences Center				
Time	**Chairman**	**Programs (Speakers- Activities-Sessions)**		**Place**
15:50-16:20	Prof. Selim A. Mohammadein Prof. S. Ammar	Invited speaker	**Prof. Samir H. Saker** Faculty Science, New Mansoura University **Rubio De Francia Extrapolation Theorems in The Theory of $\mathcal{B}p$ −Discrete Weights**	Conf. Hall
16:20-16:40		Invited speaker	**Prof. Selim A. Mohammadein** Faculty Science, Tanta University **New Treatment of Fluid Mechanics with Heat and Mass Transfer: Theory of Diffusion**	Hall (B)
16:20-17:20		**Closed Sessions (15 Researches)**		Halls
17:20-17:50		Invited speaker	**Prof. Sankar Kumar Roy** Dept. of Applied Mathematics with Oceanology and Computer Programming, Vidyasagar University, West Bengal, India **Digitalizing Uncertain Supply Chain through Industry 4.0**	Conf. Hall Online
17:50-18:20	Prof. Abd El-Aziz El-Bagory Prof. S. Ammar	Invited speaker	**Prof. Željko Stević** Assistant professor at University of East Sarajevo, Faculty of Transport and Traffic Engineering Doboj **Application of Recent Developed MCDM Methods**	Conf. Hall Online
18:20-18:50		Invited speaker	**Prof. Radeleczki Sándor Lajos** University of Miskolc **Tolerance Factor-Lattice Construction and Weak Ordered Relations**	Conf. Hall Online
18:50-20:10		**Closed Sessions (20 Researches)**		Halls

Sessions Distribution

3rd ICMSIT22 Scientific Program: (Wednesday) 21Dec. 2022, Tanta University-Conferences Center

Time	Chairman	Closed Sessions	Place
9:30-11:30	Prof. Maher Zayed Prof. A. Badawy	**Code:** # ICMSIT3-2022- PURE-1 **δ-ideals of p-algebras** Abd El-Mohsen Badawy and Essam Abd El-Baset Mahmoud Department of Mathematics, Faculty of Science, South Valley University, Qena, Egypt	Science Faculty (Third level)
		Code: # ICMSIT3-2022- PURE-2 **Types of connectedness on multi bitopological spaces** Fawzyah Mahmoud Selim Mustafa Faculty of Science - Zagazig University - Department of Mathematics	
		Code: # ICMSIT3-2022- PURE-3 **On modular GMS-algebras** Abd El-Mohsen Badawy, Abd El-Rahman Hassanein and Ragaa El-Fawal Department of Mathematics, Faculty of Science, Tanta University, Egypt and El-Azhar University	
		Code: # ICMSIT3-2022- PURE-4 **On properties of MS-algebras** Abd El-Mohsen Badawy, A.I. EL-Maghrabi and ALaa Helmy Faculty of Science, Tanta University, Tanta, Egypt Kafr Elsheikh University	
		Code: # ICMSIT3-2022- PURE-5 **On congruences of principal GK_2-algebras** Mohiedeen Ahmed Mohiedeen Abdallah, Abd El-Mohsen Badawy and Ahmed Gaber Palestinian	
		Code: # ICMSIT3-2022- PURE-6 **The Tutte polynomial of a small world connected copies of the Farey graph** A.W. Aboutahoun and Ayman Elsaid Zewail City of Science and Technology, 6th of October City, Giza, Egypt	
		Code: # ICMSIT3-2022- PURE-7 **some new generalized inequalities of Hardy and Littlewood type on alpha-conformable derivatives on time scales** Wafy Mahmoud Hasan, Hassan El-Owaidy, Ahmed El-Deeb, Haytham Rezk Faculty of Science, Al-Azhar University	

3rdICMSIT22 Scientific Program:(Wednesday)21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
9:30- 11:30	**Prof. Maher Zayed** **Prof. A. Badawy**	**Code:** # ICMSIT3-2022- PURE-8 **A new Approach to Soft Bitopological Ordered Spaces** Salama Shalil, P. D. Sobhi Ahmed El-Sheikh and D. Shehab Eldeen Ali Kandil Helwan University	Science Faculty Hall (Third level)
		Code: # ICMSIT3-2022- PURE-9 **Generalization of Fuzzy Beta Covering** Ibrahim Kamel Ibrahim Halfa Department of Mathematics and theoretical Physics, NRC, Atomic Energy Authority, Cairo	
14:00- 15:20	**Prof. S. Ammar** **Prof. A. Badawy**	**Code:** # ICMSIT3-2022- PURE-10 **Stability of Tri-Concepts** Sanaa El Assar, Ebrahim Gad and Safy Emad Salama Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-11 **Some Aspects about Iceberg Tri-Concept Lattices** Sanaa El Assar, Abd El-Mohsen Badawy, Ebrahim Gad and Safy Emad Salama Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-12 **Stability of some nonlinear functional equations** Ahmed M. A. El-Sayed Prof. of Math. Faculty of Science, Alexandria University	
		Code: # ICMSIT3-2022- PURE-13 **Graph Design for Data Authentication Over Insecure Communication Channel** R. El-Shanawany, S. A. El-Sheikh, S. R. Halawa, and H. Shabana Department of Mathematics, Faculty of education, Ain Shams University, Egypt	
		Code: # ICMSIT3-2022- PURE-14 **T-Kolmogorov numbers for relatively bounded operators** Asmaa khairy Ahmed El-sawy, Nashat fried, Manar Maher Department of Mathematics-Faculty of science- Menoufiya University	

3rdICMSIT22 Scientific Program:(Wednesday)21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
16:20-17:20	**Prof. H. Kamal** **Prof. H. Rafat**	**Code:** # ICMSIT3-2022- PURE-15 **On the irreducible representations of special Jordan triple systems** Hader A. Elgendy Damietta University	**Science Faculty Hall (Third level)**
		Code: # ICMSIT3-2022- PURE-16 **Fuzzy soft extremally disconnected spaces** Sawsan El Sayed, Ali Kandil, Osama Tantawy, Sobhy El-Sheikh Mathematics Department, College of Science Al-Zulfi, Majmaah University, Saudi Arabia	
		Code: # ICMSIT3-2022- PURE-17 **A singularly perturbed vector-bias malaria model incorporating bed net control** Sanaa Moussa Salman Alexandria University	
		Code: # ICMSIT3-2022- PURE-18 **Comparative Studies for solving Ill-Posed Problems** Esraa Mohamed Mansour Al-Baghdadi Abd Alghani Nasser Hassan Sweilam Egypt	
		Code: # ICMSIT3-2022- PURE-19 **First- order nonlinear integro-differntial equations with nonlocal condition** Mohamed El-Hawary, Reda Gamal, Ahmed. A. El-Deeb Faculty of science, Al-Azhar university	

3rdICMSIT22 Scientific Program:(Wednesday)21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
16:20-17:20	**Prof. F. Salama** **Prof. Abdelmonem Kozae**	**Code:** # ICMSIT3-2022- PURE-20 **The quasi frame and equations of non-light like curves in Minkowski E^ {3} _ {1} and E^ {4} _ {1}** Abdelrhman Tawfiq, H. K. Elsayied, and A. Elsharkawy Mathematics department, Faculty of education, Ain Shams University	Hall (A) Conf. Cen.
		Code: # ICMSIT3-2022- PURE-21 **Adomian Decomposition Method for solving nonlinear Sharma-Tasso -Oliver Equation** MAHMOUD ABDELAZIZ EISSA, Talaat S. Eldanaf, M. Elsayed, Faisal Ezz-Eldeen Abd Alaal Department of Mathematics and Computer Science, Faculty of Science, Menoufia University	
		Code: # ICMSIT3-2022- PURE-22 **Weighted Hardy type inequalities involving many functions via conformable calculus on arbitrary time scales** Karim Abd El-Basit, Ahmed Eldeep Azhar University	
		Code: # ICMSIT3-2022- PURE-23 **Strong Semilattices of Topological Fibrewise Groups** Ahmed Fathy Ahmed, Atef Aggour Al-Azhar University	
		Code: # ICMSIT3-2022- PURE-24 **Soft Generalized (β, ω)-closed Set in Soft Topological Space** Saad Darwish, Arrafa Nasef, Atef Aggour, Ahmed Fathy Al-Azhar University	

3rd ICMSIT22 Scientific Program: (Wednesday) 21 Dec. 2022, Tanta University-Conferences Center

Time	Chairman	Closed Sessions	Place
16:20-17:20	Prof. M Abdelhady Prof. A. El-Namory	**Code:** # ICMSIT3-2022- PURE-25 **AN INTERACTIVE MODEL FOR FULLY INTUITIONISTIC FUZZY MULTI-LEVEL LINEAR PROGRAMMING PROBLEM** Mohamed Abdelhameed Helmy, E. Ammar, E. Fathy Planning Techniques Center, Institute of National Planning, Egypt	Hall (B) Conf. Cen.
		Code: # ICMSIT3-2022- PURE-26 **More on Semi – Local Functions** Roshdey Mareay, A.A. Nasef, N. Youns Department of Mathematics, Faculty of Science, Kafrelsheikh University, Kafrel- sheikh, Egypt.	
		Code: # ICMSIT3-2022- PURE-27 **Fully Rough Interval Multi-Objective Quadratic Programming Problem** Elsaeed Ammar, Amr Radwan and Zeinab Abd- elrazek Department of Mathematics, Faculty of Science, Sohag University, Department of Mathematics, Faculty of Science, Tanta University,	
		Code: # ICMSIT3-2022- PURE-28 **Approximate solutions for Nash differential game** Hanem Madkour, A. A. Megahed and A. A. Hemeda Mathematics department faculty of science Tanta university	
		Code: # ICMSIT3-2022- PURE-29 **Upper bound estimation of second Hankel determinant of subclass of bi-univalent functions** S.A. Saleh & Alaa H. El-Qadeem and Mohamed A. Mamon Department of Mathematics, Faculty of Science, Tanta University	

3rd ICMSIT22 Scientific Program: (Wednesday) 21 Dec. 2022, Tanta University-Conferences Center

Time	Chairman	Closed Sessions	Place
18:50-20:10	Prof. A. Kozae Prof. F. Salama	**Code:** # ICMSIT3-2022- PURE-30 **More on generalized near openness and generalized near continuity** Abd El Fattah El-Atik and Nouran Eldagen Faculty of Science, Tanta University, Tanta, Egypt	Science Faculty Hall (Third level)
		Code: # ICMSIT3-2022- PURE-31 **Some results on soft connected spaces** Abd El Fattah El-Atik and Sally Haroun Faculty of Science, Tanta University, Tanta, Egypt	
		Code: # ICMSIT3-2022- PURE-32 **Generalized rough sets via minimal neighborhood systems and their topological spaces with applications** I. T. Shbair, A. S. Salama, A. A. El Atik and O. A. Embay Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-33 **Separation axioms in bipretopological spaces** H. Saber Osman, S. A. El-Sheikh and Abd El Fattah El Atik Ain Shams university and Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-34 **Generating some types of near openness using generalized rough sets** Shokry Nada, Abd El Fattah El Atik, Ashraf Nawar and M. Atef Menoufia University and Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-35 **Some betweenness relation topologies induced by rough sets** Shokry Nada, Abd El Fattah El Atik, Ashraf Nawar and M. Atef Menoufia University and Department of Mathematics, Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- PURE-36 **Covering rough sets in terms of topological bi-neighborhoods and their applications** Amal Abushaaban, Abdelfattah A. El Atik and O. A. Embaby Department of Mathematics, Faculty of Science, Tanta University	

3rdICMSIT22 Scientific Program:(Tuesday)20 Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
9:30- 11:30	**Prof. T. S. Amer** **Prof. Elena Evanova**	**Code:** # ICMSIT3-2022- APP -1 **On the vibrational motion of a subjected triple rigid body pendulum's system to external moments** Salma K. Zakria F. M. El-Sabaa, T. S. Amer, A. A. Galal Department of Mathematics, Faculty of Education, Ain Shams U.	Hall (A) Conf. Cen.
		Code: # ICMSIT3-2022- APP -2 **The optimal deceleration for a rotation motion of asymmetric rigid body** Al Shaimaa Sallam Department of Mathematics, Faculty of Edu., Ain Shams Un.	
		Code: # ICMSIT3-2022- APP -3 **On the motion of a nonlinear 3DOF dynamical system in an elliptic trajectory** Seham S. Hassan Mathematics Department, Faculty of Science, Damietta Un.	
		Code: # ICMSIT3-2022- APP -4 **Periodic solutions and stability for a sextic galactic potential function** Hadeer M. A. Gad, F. M. El-Sabaa, T. S. Amer Mathematics Department, Faculty of Edu., Ain Shams University, Egypt	
		Code: # ICMSIT3-2022- APP -5 **Simulating the behavior of a 2DOF dynamically controlled absorber** Rewan Fathy Mohamed Elbaz Demonstrator at the faculty of Science Port Said university	
		Code: # ICMSIT3-2022- APP -6 **On the nonlinear rotatory motion of a charged gyrostat** I. M. Abady, F.M. El-Sabaa, T. S. Amer, A. A. Sallam Faculty of Science, Suez University	

		Code: # ICMSIT3-2022- APP-7 **Stabilization of Stationary Motions of a Gyrostat with a Cavity Filled with Viscous Fluid** Hala A. Abdo, T. S. Amer, H. M. El-sherbiny, I. M. Abady Department of Mathematics and Computer Science, Faculty of Science, Suez University, Suez 43518, Egypt	
		Code: # ICMSIT3-2022- APP -8 **The dynamical motion of a symmetric rigid body for the case of irrational frequencies** Abdallah A. Galal, T. S. Amer, H. El-Kafly Engineering Physics and Mathematics Department, Faculty of Engineering, Tanta	

3rd ICMSIT22 Scientific Program: (Wednesday) 21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
14:00-15:20	**Prof. R. Starosta** **Prof. M. Sirwah**	**Code:** # ICMSIT3-2022- APP-9 **Study the influence of some external forces on the rotational motion of a rigid body** Asmaa Amer, Tarek Amer, and Abdallah Galal Faculty of Science, Menoufia University	Hall (A) Conf. Cen.
		Code: # ICMSIT3-2022- APP -10 **Modeling and stability analysis of a damped auto-parametric pendulum's model** Asmaa Arab, T. S. Amer; Magdy A. Sirwah Physics and Engineering Mathematics Department, Faculty of Engineering, Tanta University	
		Code: # ICMSIT3-2022- APP -11 **Modeling, stability and stick-slip behavior analysis of melting plastic hydraulic injection system** Hamouda Ahmed Hamouda Abueldahab, Prof. Dr. Tarek Saleh Amer Department of Basic Science, Faculty of Engineering, Horus University-Egypt, New Damietta, Egypt	
		Code: # ICMSIT3-2022- APP -12 **Studying the influence of an energy harvesting device on a vibrating dynamical model Forces.** Amany F. Abolila, T. S. Amer, A. A. Galal Department of Physics and Engineering Mathematics, Faculty of Engineering, Tanta University	
		Code: # ICMSIT3-2022- APP - 13 **Studying the motion of a 3DOF dynamical system near resonances** Abdelkarim S. Elameer, T. S. Amer Department of Mathematics and Computer Department of Physics and Engineering ,Mathematics, Faculty of Engineering Tanta University	
		Code: # ICMSIT3-2022- APP -14 **The Dynamical Motion of a Rigid Body with a Spherical Cavity: Modeling and Analysis** T. S. Amer, I. M. Abady Afaf M. Farag Mathematics Department, Faculty of Science, Tanta University	

3rd ICMSIT22 Scientific Program: (Wednesday) 21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
14:00-15:20	**Prof. Selim A. Mohammadein** **Prof. S. Ammar**	**Code:** # ICMSIT3-2022- APP-15 **Life span of vortical structures in three-dimensional isotropic turbulent flow** Hadeer Mohamed Ahmed Mohamed, Waleed Abdel Kareem - Zafer Asker - Hamed El Sherbiny Mathematics and Computer Science department, Faculty of Science, Suez University	**Hall (B)** **Conf. Cen**
		Code: # ICMSIT3-2022- APP -16 **The scattering surface waves of buried object between two piezoelectric layers** Rania Yahya, Khaled M. Elmorabie Faculty of Science, Tanta University	
		Code: # ICMSIT3-2022- APP -17 **The Killing symmetries of a perfect fluid ball representing a neutron star** Tahia Dabash, M. Emam and Tahia. F. Dabash SUNY Cortland university, Tanta university	
		Code: # ICMSIT3-2022- APP -18 **Long-period dynamics of space debris in the GEO region** Dina Tarek Omar faculty of science Tanta University	
		Code: # ICMSIT3-2022- APP -19 **Mathematical aspects of extensive and nonextensive exp. and log. distributions** Amira Adel Ali Ghoniem, A. Tawfik, A, E. Aboanber FUC, Tanta University, Tanta University	

3rdICMSIT22 Scientific Program:(Wednesday)21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
14:00-15:20	**Prof. S. Ammar** **Prof. S. A. Mohammadein**	**Code:** # ICMSIT3-2022- APP-20 **A Novel Approach in Examining Nonlinear Azimuthal Instability of Walters' B Viscoelastic Fluids Subjected to a Uniform Axial Rotation** Marwa H. Zekry, Galal M. Moatimid Faculty of Science, Beni-Suef University, Beni-Suef, Egypt **Code:** # ICMSIT3-2022- APP -21 **Eigenstructure Assignment for A Dynamic Electric Power System** Mahmoud Hanafy Saleh, Tarek Anwar Madbouly PHD **Code:** # ICMSIT3-2022- APP-22 **Peristaltic flow of viscous nanoparticles Al2O3/water nanofluids inside a vertical cylindrical tube** Prof. Dr. Mohammadein S.A.& Dr. Maha S. Ali & Reem Ali Mathematics Department - Faculty of science - Tanta University **Code:** # ICMSIT3-2022- APP-23 **New Treatment of Wave Solutions of The Nonlinear Burger Equation** Mohammadein S. A. and Sherif A. Gouda Mathematics Department, Faculty of Science, Tanta University, Egypt **Code:** # ICMSIT3-2022- APP-24 **The Effect of Peristaltic Motion on Nanoparticles CuO/Water Nanofluids Inside a Vertical Cylindrical Tube** Prof. Dr. Mohammadein S. A., Dr. Maha S. A., Baghagho M. A. Mathematics Department - Faculty of Science - Tanta University	Hall (C) Conf. Cen.

3rd ICMSIT22 Scientific Program: (Wednesday) 21 Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
16:20-17:20	**Prof. Selim A. Mohammadein** **Prof. S. Ammar**	**Code:** # ICMSIT3-2022- APP -25 **Equations of Motion for Spinning Fluids in Bi-metric Type Theories of Gravity** Shymaa Refaey, Magd E. Kahil, Samah A. Ammar Faculty of Engineering, Modern Sciences and Arts University	Hall (C) Conf. Cen.
		Code: # ICMSIT3-2022- APP -26 **NEW RESULT OF POSITIVE SOLUTIONS FOR FRACTIONAL PANTOGRAPH PROBLEM** Hamid Boulares Guelma university, Algeria	
		Code: # ICMSIT3-2022- APP-27 **Rubber Sheet Geometry in Designing Process** Mahmoud A. Nasef, A. Salama, M. Darwish, M. Shokry Faculty of Engineering, Tanta University	
		Code: # ICMSIT3-2022- APP-28 **Fuzzy Preventive Maintenance** Eman Elghamry, Philip Scarf Lecturer at Mathematics and engineering physics department, faculty of engineering, Tanta University	
		Code: # ICMSIT3-2022- APP-29 **PROPAGATION OF INTERNAL GRAVITY WAVES ON STAGGERED FINITE- DIFFERENCE MODEL** MUHAMAD NAJIB ZAKARIA, ANG TAU KEONG UNIVERSITI TEKNOLOGI MALAYSIA	
		Code: # ICMSIT3-2022- APP-30 **Quantum dynamics of three two-level atoms interacting with one mode of electromagnetic field in the presence of detuning parameter** Hasnaa Saad, M. Abu-Shady, S. I. Ali, H. F. Habeba Faculty of Science Menoufia University / Faculty of Science, Al-Azher University	

3rd ICMSIT22 Scientific Program: (Wednesday) 21Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
9:30-11:30	**Prof. M. A. Al-Damsesy** **Prof. M. M. Ezzat**	**Code:** # ICMSIT3- 2022-STA-1 **Comparison Vector Autoregressive and Long Short-Term Memory for forecasting Air Pollution Index in Jakarta** ARISKA FITRIYANA NINGRUM, AGUS SUHARSONO, SANTI PUTERI RAHAYU Institut Teknologi Sepuluh Nopember	**Hall (B)** **Conf. Cen.**
		Code: # ICMSIT3- 2022-STA-2 **Statistical inference to the lifetime parameters of Flexible reduced logarithmic - inverse Lomax distribution under Hybrid type-II censored data to bladder cancer** Dina A. Ramadan; M. Mustafa Buzaridah; B. S. El-Desouky Mansoura University	
		Code: # ICMSIT3- 2022-STA-3 **Statistical Inference under hybrid type II censoring scheme for the truncated Weibull Rayleigh distribution with application to COVID 19 data** Eman Hassanein Khalifa Mansoura University - College of Science	
		Code: # ICMSIT3- 2022-STA-4 **Bayesian and Non-Bayesian Estimation for Burr Type X under Trimmed Samples with Application of Glass Fibers** E. M. Eldemery, A. M. Abd-Elfattah, K. M. Mahfouz, and Mohammed M. El Genidy Department of Mathematics and Computer Science, Faculty of Science, Port Said University, Port Said, Egypt.	
		Code: # ICMSIT3- 2022-STA-5 **Algorithm of Estimating Three-Parameters Distribution and its application in banks** Wesal Megahed Hamam, Ahmed. M. El Genidy, K. M. Abd-El Wahab El Obour Institute for Management & Informatics	

		Code: # ICMSIT3- 2022-STA-7 **Proportional Hazard Bivariate Kumaraswamy Model applied on Fish Mercury Concentration** Ayat Mohamed Sobhy Salem, W. A. Hassanein, M.M.E. Abd El-Monsef Faculty of Science, Tanta University	
		Code: # ICMSIT3- 2022-STA-8 **Constrained Probabilistic Multi-Source Inventory Model by Decreasing Holding Cost with Weibull and Lindley-Weibull Distributions** Magda Gomaa, Hala Fergany Faculty of science - Tanta University	

3rd ICMSIT22 Scientific Program: (Wednesday) 21 Dec. 2022, Tanta University-Conferences Center			
Time	**Chairman**	**Closed Sessions**	**Place**
9:30-11:30	**Prof. E. El-Kholy** **Prof. H. Kamal**	**Code:** # ICMSIT3- 2022-IT-1 **Machine Translation based on Bi-directional Translation** Ibrahim Gad, El-Sayed Atlam, Ghada Elmarhomy and Mahmoud Elmezain Faculty of Science, Tanta University, Egypt	Hall (C) Conf. Cen.
		Code: # ICMSIT3- 2022-IT-2 **Vision-based Human Behavior Analysis in Video Sequences** Mahmoud Elmezain, Ibrahim Gad and El-Sayed Atlam Tanta University, Faculty of Science, Computer Science Division	
		Code: # ICMSIT3- 2022-IT-3 **A Review of Android Malware Detection Approaches Based on Ontology** Doaa Aboshady, Naglaa Ghannam, Eman Elsayed, Lamiaa Diab Mathematics Department, Faculty of Science, Tanta University, Tanta, Egypt	
		Code: # ICMSIT3- 2022-IT-4 **A Comparative Study of Android Malware Detection Approaches Based on Ontology** Doaa Aboshady, Naglaa Ghannam, Eman Elsayed, Lamiaa Diab 1Mathematics Department, Faculty of Science, Tanta University,2Mathematics Department, Faculty of Science, Al-Azhar University (Girl's branch), 3School of Computer Science, Canadian Cairo	
		Code: # ICMSIT3- 2022-IT-5 **A review on deepfake video creation and detection techniques** Aya Ismail, Marwa Elpeltagy, Mervat S. Zaki, Kamal Eldahshan Mathematics Department, Faculty of Science, Tanta University, Tanta, Egypt	
		Code: # ICMSIT3- 2022-IT-6 **A Quantum Algorithm for Detecting Noisy Patterns in IoT Applications Based on Zidan's Model** Shefaa Abdo Mathematics Department, Faculty of Science, Tanta University, Tanta, Egypt	

		Code: # ICMSIT3- 2022-IT-7 **A method for brain stroke detection based on tensor decomposition and CNN model** Elham Alfeky, Mosaad W. Hassan and Amira Abd El-Atey Mathematics Department, Faculty of Science, Tanta University, Tanta, Egypt	
		Code: # ICMSIT3- 2022-IT-8 **Similarity Measure for Decision Making** Tamer Medhat, Mohsen Eid, Manal Elsaid Ali Faculty of Engineering, Kafrelsheikh University	

Invited Speakers

Digital Twinning and Artificial Intelligence: Recent Trends and Applications			
Prof. Aboul Ella Hassanein			
Faculty of Computers & Artificial Intelligence – Cairo University			
Date:	20 / 12 / 2022	**Time:**	10:50 – 11:20

Abstract

The digital twin creates virtual copies of physical locations, plant processes, business processes as well as assets, and, paired with AI, enables plant operators to find value within plant data that they can then leverage to drive improvement across various operations. This talk reviews the basic concepts of digital twining, its classification, applications, and prospects of AI in digital twins. We discuss the applications of digital twins in the many areas of drug discovery, medicine, manufacturing in production workshops, cultural heritage, and smart city transportation, and we review the current challenges and topics that need to be looked forward to in the future.

Mechanics as the Method of Studying Nature			
Prof. Elena A. Ivanova			
Higher School of Theoretical Mechanics, Russia			
Date:	20 / 12 / 2022	**Time:**	11:20 – 12:00

Abstract

It is known that, before the beginning of the 20th century, all physical processes were described by means of mechanical models. We use an analogous approach, but we are based on different mechanical models. The fundamental differences between our models and the models of the 19th century are as follows. Firstly, our models include rotational degrees of freedom. Secondly, our models are based on using open systems. We consider mechanics to be the method of studying physical process. This method consists of the following steps. 1) We choose a mechanical model corresponding to our intuitive understanding of the nature of the physical process. 2) We formulate differential equations describing the mechanical model. 3) We suggest analogies between mechanical quantities and quantities characterizing the physical process. 4) We rewrite the differential equations in terms of the physical quantities. 5) We make sure that, in some particular cases, the obtained equations coincide with the known physical equations. 6) We interpret the exact differential equations as a generalization of the known physical equations. We emphasize that the purpose of our study is not to derive known physical equations, but to obtain new physical equations that generalize the known equations. We

present two models that allow us to obtain generalizations of Maxwell's equations. One of these models allows us to obtain equations that are a three-dimensional analogue of Kirchhoff's laws for electrical circuits. Another model allows us to generalize Maxwell's equations to the case of permanent magnets.

New Aspects on Quantum Entanglement and Cybersecurity			
Prof. Mahmoud Abdel-Aty			
Faculty of Science – Sohag University			
Date:	20 / 12 / 2022	**Time:**	12:30 – 13:00

Abstract

In this work, we discuss the entangled photons which are generated at the new wavelength to be able to travel as far as the photons generated through existing methods, and used for satellite communication. As for the quantum entanglement as an indicator, there are various different ways to address daylight communication, even though the technology isn't as developed as for other wavelengths, one may have a new way to accelerate the process. Finally, we discuss how quantum entanglement can be used to enhance the cyber security protocols.

The Influence of Weakly Pronormal Subgroups on the Structure of Finite Groups			
Prof. Mohamed Asaad			
Faculty of Science – Cairo University			
Date:	20 / 12 / 2022	**Time:**	13:00 – 13:30

Abstract

Let G be a finite group. A subgroup H of G is called pronormal in G if for every $g \in G$, H and H^g are conjugate in $< H, H^g >$. A subgroup H of G is called weakly pronormal in G if there exists a subgroup K of G such that $G = HK$ and $H \cap K$ is pronormal in G. In this article, we investigate the structure of G under the assumption that some subgroups of G are weakly pronormal in G.

Stability of Some Nonlinear Functional Equations			
Prof. Ahmed M. A. El-Sayed			
Faculty of Science, Alexandria University			
Date:	20 / 12 / 2022	**Time:**	13:30 – 14:00

Abstract

Here, we study the Hyers - Ulam stability and continuous dependence of the solution of some nonlinear functional equations. The nonlinear Hybrid functional equations will be also studied.

Asymptotic Behavior of Ordered Statistics and Record Values in a Mixture of Two Gaussian Sequences			
Prof. Haron M. Barakat			
Faculty of Science, Zaqazig University			
Date:	20 / 12 / 2022	**Time:**	14:00 – 14:30

Abstract

In this talk, we investigate the limit distributions of extreme, intermediate, and central order statistics, as well as record values, of a mixture of two stationary Gaussian sequences under an equi-correlated setup. Moreover, when the random sample size is assumed to converge weakly and to be independent of the basic variables, the asymptotic distributions of that statistics are derived. An interesting fact is revealed that in several cases, the limit distributions of the aforementioned statistics are the same when the sample size is random and non-random. e.g., when one mixture component has a correlation that converges to a non-zero value.

Multiple Scale Methods in Predicting Nonlinear Vibrations of Discrete Mechanical Systems			
Prof. Roman Starosta			
Poznan University of Technology, Poland			
Date:	20 / 12 / 2022	**Time:**	14:30 – 15:10

Abstract

It has been observed over time that various asymptotic methods, including the multiple scale method (MSM), can be very attractive to engineers and scientists in solving nonlinear problems despite significant progress in numerical techniques. MSM allows one not only to solve many problems of physics and technology, but also to predict essential features of the analyzed nonlinear vibrations. The latter may have either harmful effects from the point of view of applications or may give some benefits depending on needs and expectations. Although MSM has its roots in the development of nonlinear science, it raises new questions and problems that science and technology must face and can be understood as a competition to recently developed and widely used computational techniques based on the numerical approaches. The MSM may not only predict archetypical features of nonlinear dynamic phenomena but also compete with the results accuracy of the classical numerical methods. This lecture concerns discrete mechanical systems in the form of coupled oscillators with several degrees of freedom. The motion of systems is governed by second-order equations transformed into their dimensionless

counterparts. The latter can be obtained either by direct physical and mathematical modeling of numerous engineering problems where one may clearly separate the mass objects linked by massless stiffness and damping elements or via considering the continuous mass distribution of mechanical systems like rods, strings, beams, plates and shells governed by nonlinear PDEs.

Numerical Studies of Climate Change Models under Piecewise Hybrid Fractional Derivative			
Prof. Nasser H. Sweilam			
Faculty of Science, Cairo University			
Date:	20 / 12 / 2022	**Time:**	16:00 – 16:30

Abstract

Many real-life problems have processes that exhibit crossover behavior. Modeling processes based on crossover behaviors has proven to be a difficult task for mankind. In various instances, real-world difficulties have been observed as a result of the transition from Markovian to randomness processes, such as in epidemiology with the spread of infectious illnesses and even some chaos. To build the future state of the system and unpredictability, deterministic and stochastic approaches were developed independently. In this talk, we extended two mathematical models of climate change by applying the piecewise differential equation system. The new hybrid fractional order operator can be written as a linear combination of the fractional order integral of Riemann-Liouville and the fractional order derivative Caputo is applied to extend the deterministic model and the fractional Brownian motion is applied to extend the stochastic differential equations. The positivity, boundedness, existence of the solutions for the model are discussed. New numerical algorithms are improved to solving the proposed model. Numerical examples and

comparative studies for testing the applicability of the utilized method and to show the simplicity of this approximation approach are presented.

Bi-metric Types Theories of Gravity: The Problem of Motion			
Prof. Magd E. Kahil			
Faculty of Engineering, MSA-University			
Date:	20 / 12 / 2022	**Time:**	16:30 – 17:00

Abstract

Bi-metric theories of gravity are regarded as alternative theories of gravity dealing with strong gravitational fields. From this perspective, equations of motion for different particles of various characteristic behavior such as charged or spinning ones are obtained. Also, equations of path deviation associated for each type of particles are derived. It is worth mentioning that studying the problem of motion may be used to examine the stability of orbiting object near strong sources of gravity. Also, the dark matter problem can be expressed as an equation of motion for a variable mass in the presence of strong field of gravity.

Explicit Solutions for Some Queueing Systems: New Trends			
Prof. Ahmed M. K. Tarabia			
Faculty of Science, Damietta University			
Date:	20 / 12 / 2022	**Time:**	17:00 – 17:30

Abstract

This article presents a short and elegant survey on explicit solutions for some queueing systems. The outline of a new technique called randomization is also considered to illustrate how this technique can be used to obtain new transient solutions for some queueing models which may can't to obtain by the direct methods. Moreover, based on generating function technique and a direct approach, transient and steady state analyses of the queue length of some Markovian queues with balking, catastrophes, server failures and repairs are carried out. Summarizing the past work related to the computation of the transient state behavior of the given for different queueing models with different features. Finally, summarizing the significant new trends in research on these models and identifying some areas that need to be addressed in the future in this field.

Some Real-Life Applications of Generalized Topologies	
Prof. Abdelmonem Kozae	
Faculty of Science – Tanta University	

Date:	21 / 12 / 2022	Time:	9:00 – 9:30

Abstract

The aim of this talk is to explore some types of generalized topological structures and present the importance of these structures in recent directions of real-life applications.

Extensive or Nonextensive Statistics			
Prof. Abdel Nasser Tawfik			
Future University in Egypt			
Date:	21 / 12 / 2022	**Time:**	12:00 – 12:30

Abstract

Due to its availability and for the sake of simplicity, extensive additive Maxwell-Boltzmann statistics is widely almost-blindly utilized, whatever the degree of nonextensivity of the underlying ensemble would be. The various types of nonextensivity are mainly characterized by a categorical violation of the fourth Shannon–Khinchen additivity axiom. When comparing between the entropies deduced from Maxwell-Boltzmann, Tsallis, and generic statistics, for instance, we realize the essential role that the nonextensivity parameters play and the importance of applying appropriate statistics that manifests the statistical, informational, and thermodynamical nature of the underlying ensemble.

On Uniform Modules			
Prof. Maher Zayed			
Faculty of Science – Benha University			
Date:	21 / 12 / 2022	**Time:**	12:30 – 13:00

Abstract

The aim of this note is to present some subjects from Module theory from a model-theoretic point of view. Let P be any property of modules, such as, being simple or being uniform. Let Ω be the class of all finite dimensional indecomposable modules having the property P and

$$\Omega^* = \{X \in Mod(R): X \equiv \bigoplus M_i, M_i \in \Omega\}$$

Ω^* is elementarily closed and closed under direct products. It is shown that Ω is finite if and only if Ω^* is axiomatizable if and only if Ω^* is closed under reduced products. In this case $T^* = Th(\Omega^*)$ is a Horn theory. Further T^* has finitely many models up to $\equiv$. Applications to the class of uniform modules are given.

(1) - Double Fuzzy Rarely Continuous Functions (2) - Is Quantum Gravity a Falsifiable Physical Theory?				
Prof. Saeid Jafari				
Mathematical and Physical Science Foundation, Denmark				
Date:	21 / 12 / 2022	**Time:**	**Lec. (1):** 13:00 – 13:15	
			Lec. (2): 13:15 – 13:30	

Abstract (1)

In my talk, I define fuzzy rare set, fuzzy dense set and fuzzy rarely continuous functions in double fuzzy topo- logical spaces. Moreover, I will present several of their interesting properties and characterizations.

Abstract (2)

In this talk I will discuss the interplay between mathematics and physics and focus on the falsifiability principle.

Rough-Set-Based Decision Model and MCDM Applications for Incomplete Information Systems			
Prof. Safiye Turgay			
Sakarya University, Turkey			
Date:	21 / 12 / 2022	**Time:**	13:30 – 14:00

Abstract

Today, the enormous increase and the complexity of the data make it inevitable to use rough set in the data analysis process. With the increasing data traffic, uncertainty and deficiency situations require ordering and grouping data variables according to their importance and data quality before the learning process. In this study, the analysis structure of decision models and MCDM methods was discussed in the process of data analysis. Increasing the pre-learning data quality of the features will also positively affect the quality and speed of learning. The rough set approach includes the advantages of obtaining information directly, keeping the information in mind, reducing information and evaluating the relationship between variables through reasoning. It understands the classification as the equivalence relation in a particular space, and the equivalence relation constitutes the division of the space. In this study, the main features of coarse clustering and the role it played in the data analysis process were emphasized. Data analysis and multi-criteria decision-making technique are among the complementary subjects of decision science. In this context, the pre-analysis quality of the existing data is increased with rough cluster-

based number analysis. Data analysis, data mining and MCDM methods were handled as a whole. Especially with the analysis of incomplete data, it is aimed to select the rules that will help decision-making. The main differences between them were examined by examining the studies done so far.

Rubio De Francia Extrapolation Theorems in The Theory of $\mathcal{B}_p$ −Discrete Weights			
Prof. Samir H. Saker			
Faculty Science, New Mansoura University,			
Date:	21 / 12 / 2022	**Time:**	15:50 – 16:20

Abstract

In this talk, I will present some discrete Rubio De Francia extrapolation theorems for nonincreasing sequences in the setting of the discrete $\mathcal{B}_p$ −weights. I also present some extensions to the discrete $\mathcal{B}_\infty$ −weights. The proof of the results based on some fundamental properties of the discrete $\mathcal{B}_p$ −weights including the self-improving property. To the best of the authors' knowledge the discrete extrapolation theorems in connection with $\mathcal{B}_p$ −weights are essentially new.

New Treatment of Fluid Mechanics with Heat and Mass Transfer: Theory of Diffusion

Prof. Selim A. Mohammadein

Faculty Science, Tanta University,

Date:	21 / 12 / 2022	**Time:**	16:20 – 16:40

Abstract

Most problems in fluid mechanics formulated by nonlinear Partial differential equations. The analytical solutions of nonlinear Partial differential equations in fluid mechanics are considered a strong obstacle up to date. The linear velocity operator is formulated in terms of a generalized new physical parameter. In this talk, the nonlinear Navier-Stokes, Burger, and Korteweg-deVries equations are converted to the linear diffusion equation based on the proposed linear velocity operator concept for the first time. Mohammadein Parameter M* has a different physical meaning in fluid mechanics and heat mass transfer. The momentum and energy quantitative equations have been generalized in the form of one linear diffusion equation under different influences. Schrödinger equation in quantum mechanic's field is derived by our theory. Moreover, the present theory introduced a new point of views for a simplification of formulation and analytical solutions of many problems in the fields of physics, engineering, and biomedical sciences.

Digitalizing Uncertain Supply Chain through Industry 4.0			
Prof. Sankar Kumar Roy			
Vidyasagar University, India			
Date:	21 / 12 / 2022	**Time:**	17:20 – 17:50

Abstract

In this talk, we first define the supply chain management and then we take into account the concept of traditional supply chain management and its various drawbacks. In the recent era, industry 4.0 is the understanding of digital transformation of the field, providing real-time decision making, increased productivity, flexibility and agility that are chosen in this talk. Thereafter we take the advantage to discuss the digital supply chain and its various directions. Nowadays real-life is of full of uncertainty, that is why the next wing is to consider the uncertainty of digital supply chain and its facilities. Finally, a line of conclusions of the talk are taken into consideration. At last, some future scopes are put for the interested researchers.

Application of Recent Developed MCDM Methods			
Prof. Željko Stević			
University of East Sarajevo, Bosnia and Herzegovina			
Date:	21 / 12 / 2022	**Time:**	17:50 – 18:20

Abstract

Everyday decision-making requires consideration of various influencing factors. Important tools for solving and supporting such problems are recently developed MCDM approaches, often in combination with uncertainty theory or other approaches. This lecture emphasizes the rapid development of this field and its importance for solving scientific and professional problems shown in practical examples. Full Consistency Method (FUCOM) method, fuzzy PIPRECIA (PIvot Pairwise RElative Criteria Relevance Assessment), and Measurement of Alternatives and Ranking according to the Compromise Solution (MARCOS) method have been elaborated and showed their importance for solving MCDM problems.

Tolerance Factor-Lattice Construction and Weak Ordered Relations			
Prof. Radeleczki Sándor Lajos			
University of Miskolc – Hungary			
Date:	21 / 12 / 2022	**Time:**	18:20 – 18:50

Abstract

G. Czédli proved that the blocks of any compatible tolerance T of a lattice L can be ordered in such a way that they form a lattice L/T called the factor lattice of L modulo T. Here we show that the Dedekind–MacNeille completion of the lattice L/T is isomorphic to the concept lattice of the context (L, L, R), where R stands for the reflexive weak ordered relation $\leq \circ T$. Weak ordered relations constitute the generalization of the ordered relations introduced by S. Valentini. Reflexive weak ordered relations can be characterized as compatible reflexive relations on L satisfying $R = \leq \circ R \circ \leq$.

Pure Mathematics

Code: # ICMSIT3-2022- PURE-1

δ-ideals of p-algebras

Abd El-Mohsen Badawy and Essam Abd El-Baset Mahmoud

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South Valley University, Qena, Egypt

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Abstract: The concepts of δ-ideals and principal δ-ideals are introduced in p-algebras. Many properties of δ-ideals and principal δ-ideals are investigated. It is observed that the set $B_*(L)$ of all principal δideals of a p-algebra L forms a Boolean algebra and the set I_δ (L) of all δ-ideals is a bounded distributive lattice. A set of equivalent conditions is obtained to characterize δ-ideals in a quasi-modular S-algebra in terms of principal δ-ideals. The concept of co-maximality is studied in p-algebras. Finally, some properties of δ-ideals are studied with respect to homomorphisms.

Code: # ICMSIT3-2022- PURE-2

Fully Rough Interval Multi-Objective Quadratic Programming Problem

Elsaeed Ammar, Amr Radwan and Zeinab Abd- elrazek
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Abstract: In this paper, we concentrate on dealing with fully rough multi-objective quadratic programming, where all variables and parameters are rough intervals . In order to solve this problem and find rough value efficient solutions and decision rough variables by using the weighting method and then the slice sum method. First, we use the weighting method to convert fully rough multi-objective quadratic programming to single fully rough quadratic programming. Then we use the slice sum method, which depends on constructing two QP problems with interval coefficients, and then to four crisp QPs. We use Kuhn-Tucker point to solve the four crisp quadratic programming problems. Finally, the effectiveness of the proposed procedure is demonstrated by numerical examples.

Code: # ICMSIT3-2022- PURE-3

On Modular GMS-algebras

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Abstract: In this paper, we define and characterize the concept of K_2-congruence pairs of modular generalized MS-algebras from the subclass K_2 (briefly K_2-algebras) due to A. Badawy [1]. We observe that every congruence relation θ of a K_2-algebra L with L^{∨}=[d) associated with a unique K_2-congruence pair (θ_1,θ_2) where θ_1 is a congruence on the Kleene algebra L^{∘∘} and θ_2 is a lattice congruence on the modular lattice L^{∨}. Also, we investigate special K_2-congruence pairs of a K_2-algebra L using its Boolean elements and derive their properties. We study the concept of n-permutability of a K_2-algebra L with L^{∨}=[d) in terms of K_2-congruence pairs.

Code: # ICMSIT3-2022- PURE-4

On properties of MS-algebras

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Abstract: In this paper, we introduce the concepts of subalgebras, principal subalgebras and d_L-subalgebras of a principal MS-algebra and describe the lattices of such subalgebras. We determine and characterize the principal subalgebras of a principal MS-algebra via admissible pairs. Also, we conclude many properties of d_L-subalgebras. Also, we conclude many properties of d_L-subalgebras of a principal MS-algebra by means of principal MS-triples. Finally, some "fill-in" problems are considered of a principal MS-algebra by means of principal MS-triples. Finally, some "fill-in" problems are considered.

Code: # ICMSIT3-2022- PURE-5

Some Aspects about Iceberg Tri-Concept Lattices

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Abstract: The main purpose of this paper is to explore the notion of the tri-concept lattice formed from the nested diagram of three concept lattices, arising from three contexts. Our objective is to obtain a reduced form of the tri-concept lattice using Iceberg diagram. Iceberg Concept lattice is a conceptual clustering method, which is well-suited for analyzing very large datasets. They also serve as a condensed representation of frequent Item sets. We also investigate the combined association rules of the tri-concept lattices and suggest an algorithm “TRIAR” to compute the confidences and supports of the new rules of Tri-concepts, using different bases of the association rules.

Code: # ICMSIT3-2022- PURE-6

Stability of Tri-Concepts

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Abstract: In the present paper, we introduce the notion of a tri-concept lattice which arises from different data sources. The given data could be in binary, multivalued or numerical form. The problem of selecting the most interesting concepts is considered, using the stability indices, to prune the arising tri-concept lattice and visualizing it by a nested diagram using a suggested algorithm “TRINEST”. We also propose the algorithm “TRISTA” to compute the combined stability of the tri-concepts.

Code: # ICMSIT3-2022- PURE-7

The Tutte polynomial of a small world connected copies of the Farey graph

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Abstract: The Tutte polynomial of a graph which is important in Combinatory, Statistical physics and Bio Chemistry. We study a two-variable polynomial graph invariant of considerable. The established graph originates from the duplication of Farey graphs. The Tutte polynomial is used to determine the number of spanning trees, as well as the number of connected spanning subgraphs. Finally, we get the entropy from the exact formula of the number of spanning trees.

Code: # ICMSIT3-2022- PURE-8

More on generalized near openness and generalized near continuity

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Abstract: Generalized topologies became important to suggest solution for some real life problems. We aim in this paper to generate some types of near open sets called $\nu - \alpha - open$ and $\nu - \beta - open$ sets. Some of their characterizates are investigated. Moreover, new kinds of $\nu - \alpha - continuos$ and $\nu - \beta - continuos$ functions are studied. A comparison between our results and study of Sabir Hussain is discussed and some counter examples are introduced. Finally, we present some application in medicine.

Code: # ICMSIT3-2022- PURE-9

Some results on soft connected spaces

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Abstract: The concept of soft coverings is one of the fundamental concepts in soft topological spaces and plays a big part in the study of soft topological problems. This motivates the research of soft covering soft rough sets from soft topological points of view. From soft topological points of view, we can get a good insight into the essence of soft covering soft rough sets and make our discussions concise and profound. In this paper, we first construct a type of soft topology called the soft topology induced by the soft covering on a soft covering approximation space. This notion is indeed in the core of this paper. Then we use it to define the concepts of soft neighborhoods, soft closures and soft connected space. Drawing on these concepts, we define several pairs of approximation operators. We not only investigate the relationships among them, but also give clear explanations of the concepts discussed in this paper. For a given soft covering approximation space, we can use the soft topology induced by the soft covering to investigate the soft topological properties of the space such as soft separation, soft connectedness, etc.

Code: # ICMSIT3-2022- PURE-10

Generalized rough sets via minimal neighborhood systems and their topological spaces with applications

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Abstract: Rough sets theory is an important role to deal with uncertainty objects. In this paper, we introduce some new types of generalized rough sets based on minimal neighborhood systems via arbitrary binary relations. Moreover, four types of dual approximation operators are generated by core minimal neighborhood systems. A comparison between these types of different approximation operators is investigated. Different kinds of topological spaces by these minimal core neighborhood systems are introduced. A comparison between these generated topologies is discussed. Finally, two medical applications are introduced to show the significance of utilizing the minimal neighborhood systems in the proposed methods.

Code: # ICMSIT3-2022- PURE-11

Separation axioms in bipretopological spaces

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Abstract: In this paper, we introduce and study generalization of pretopological spaces called bipretopological spaces depending on two pretopological spaces on arbitrary universal sets. New kinds of separations axioms on bipretopological spaces are established and some of their properties are investigated. A comparison between four separation axioms on bipretopological spaces and pretopological spaces with different sorts of counter examples are presented.

Code: # ICMSIT3-2022- PURE-12

Some betweenness relation topologies induced by rough sets

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Abstract: Zhang et al. introduced a betweenness relation as a family of order relations and study some of their related topological properties. So, in this paper, we represent any set of elements by a betweenness relation $\mathcal{B}_{<}$ and study some of their related characteristics. Thus, we define four types of neighborhoods (i.e., $\mathcal{R}_{<}(a)$, $(a)\mathcal{R}_{<}$, $\mathcal{R}_{<}^{\cap}(a)$ and $\mathcal{R}_{<}^{\cup}(a)$) from a betweenness relation and use them to investigate four types of topological structures called topological betweenness spaces (briefly, i-TBS) $\tau^{i}_{\mathcal{B}_{<}}$ for all $i \in \{1,2,\cap,\cup\}$. Their axiomatic properties are also discussed. Moreover, we construct four types of a betweenness topological approximation space (briefly, i-BTAS) based on the notion of an i-TBS. Their related properties are examined. Also, the relations between these models are studied. Finally, we compare the outcomes for these models using practical examples to clarify their effectiveness and the differences between them.

Code: # ICMSIT3-2022- PURE-13

Generating some types of near openness using generalized rough sets

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Abstract: Recently, Abo-Tabl discussed the rough approximations based on the similarity relation by defining a new neighborhood called the intersection of all right neighborhoods. So, in this paper, we study the notions of near open sets based on the models given by Abo-Tabl (i.e., $^{1}\mathcal{S_O}$, $^{2}\mathcal{S_O}$ and $^{3}\mathcal{S_O}$). Thus, we introduce another three types of near concepts based on a new reflexive relation which is considered as a generalization of the Abo-Tabl approaches (i.e., $^{4}\mathcal{S_O}$, $^{5}\mathcal{S_O}$ and $^{6}\mathcal{S_O}$). We examine their related properties and also explain the relations between them. Finally, we compare the results between Abo-Tabl's approaches and our approach.

Code: # ICMSIT3-2022- PURE-14

Upper bound estimation of second Hankel determinant of subclass of bi-univalent functions

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Abstract: In this paper, new class of bi-univalent functions are introduced. Upper bound of the second Hankel determinant $|H_2(2)|$ of subclass of bi-univalant functions class Σ, which defined by subordination, are investigated. Also, some results are concluded as a special case of our main results.

Code: # ICMSIT3-2022- PURE-15

On the irreducible representations of special Jordan triple systems

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Abstract: The purpose of this talk is to introduce the classification of finite-dimensional irreducible representations of some special Jordan triple systems. We first show the construction of the universal associative enveloping algebras of special Jordan triple systems. We then show that with respect to the triple product $xyz + zyx$, the Jordan triple system of all $n \times n$ $(n>1)$ matrices over a field of characteristic zero and the Jordan triple system of all $n \times n$ $(n>1)$ Hermitian matrices over the complex numbers have only four nontrivial inequivalent finite-dimensional irreducible representations, while the Jordan triple system of all $n \times n$ $(n>1)$ symmetric matrices over a field of characteristic zero has only two nontrivial inequivalent finite-dimensional representations. Finally, we show that with respect to the triple product $x\, y^t\, z + z\, y^t\, x$, where y^t is the transpose of y, the Jordan triple system of all $m \times n$ $(m, n >1)$ rectangular matrices over a field of characteristic zero has only one nontrivial finite-dimensional irreducible representation.

Code: # ICMSIT3-2022- PURE-16

Generalization of Fuzzy Beta Covering

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Abstract: In this paper, some new types of fuzzy beta- covering in terms of beta-neighborhoods are introduced and some of their properties are investigated. moreover, upper and lower approximations operators are established. using the iteration of each upper and lower approximations operators, we define seven fuzzy Beta- neighborhoods and so seven fuzzy Beta- covering are discussed. the comparison between them with some applied examples are presented.

Code: # ICMSIT3-2022- PURE-17

On congruences of principal GK_2-algebras

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Abstract: According to a characterization of congruence relations of principal GK_2-algebras via congruence pairs, we continue to study some properties of such algebras deal with 2-permutability of congruences, n-permutability of congruences and strong extensions using congruence pairs techniques.

Code: # ICMSIT3-2022- PURE-18

Covering rough sets in terms of topological bi-neighborhoods and their applications

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Abstract: Neighborhoods is one of important topics in topology that relies on two types of neighbors of a point and has many applications in the graph theory and in the sciences and medical sciences. In this paper, we introduce some types of bi − j−neighborhoods on generalized bi−covering approximation space. Moreover, some kinds of bi−covering rough sets using relations are presented. Some properties of these new types of covering are discussed. Pawlak's properties are studied in the case of bi−covering approximation space. More properties on different bi−neighborhoods such as bi−j−neighborhoods, complementary bi−j−neighborhoods and bi − j−adhesions are investigated. A comparison between these new types of bi−neighborhoods and bi−covering are presented with some counterexamples are given. We give applications of our results in the rheumatic fever data information by generated topologies. Keywords: Rough sets, bi−neighborhoods, bi−covering, approximation space, j−adhesion neighborhoods. Mathematics Subject Classification: 54A05, 60L20, 92C50.

Code: # ICMSIT3-2022- PURE-19

Stability of some nonlinear functional equations

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Abstract: Here, We study the Hyers - Ulam stability and continuous dependence of the solution of some nonlinear functional equations. The nonlinear Hybrid functional equations will be also studied.

Code: # ICMSIT3-2022- PURE-20

Fuzzy soft extremally disconnected spaces

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Abstract: The notion of fuzzy soft extremally disconnected spaces is introduced and studied. Many characterizations of fuzzy soft extremally disconnected space is investigated by using the concepts of fuzzy soft q-nbd, fuzzy soft regular open sets, fuzzy soft delta-closure, fuzzy soft theta-closure and mappings.

Code: # ICMSIT3-2022- PURE-21

Weighted Hardy type inequalities involving many functions via conformable calculus on arbitrary time scales

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Abstract: In this paper, we will study the conformable fractional integrals for some new weighted Hardy type inequalities on time scales. Our results generalize and extend weighted Hardy type inequalities. The weighted dynamic Hardy type inequalities is obtained as a special case, by choosing $\alpha=1$

Code: # ICMSIT3-2022- PURE-22

AN INTERACTIVE MODEL FOR FULLY INTUITIONISTIC FUZZY MULTI-LEVEL LINEAR PROGRAMMING PROBLEM

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Abstract: Intuitionistic fuzzy set theory, an extension of conventional fuzzy set theory, gauges both membership degree of acceptance and membership degree of rejection. The system includes hesitation and ambiguity if the sum of the degrees of membership and non-participation falls between [0,1]. We provide an interactive model for the fully intuitionistic fuzzy multi-level linear programming issue in this paper (FIFMLPP). The FIFMLPP is first reduced to a crisp problem using accuracy function on each level. Then, the interactive approach is provided to solve the crisp model. An example is provided for understanding the solution procedure of the proposed method.

Code: # ICMSIT3-2022- PURE-23

More on Semi – Local Functions

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Abstract: In a topological space (X,τ) any ideal I of subset of X induces a new topology $\tau*(I)$. If Y is a regular space, then under some assumptions on I , for any upper $\tau*$- quase continuous multivalued map $F:X\rightarrow P(Y)\backslash\emptyset$,the sets of all points at which F is lower quasi-continuous (lower semi-continuous with respect to $\tau*or\ \tau$ continuous). If F is compact-valued lower $\tau*$ - quasi- continuous, then the symmetrical result holds (J.Ewert)[8]. The paper concerns operators in ideal topological spaces. Some properties and characterizations of the set operator ( )$*s$ are investigated and explored.

Code: # ICMSIT3-2022- PURE-24

The quasi frame and equations of non-light like curves in Minkowski E^{3}_{1} and E^{4}_{1}

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Abstract: The quasi frame is an alternate frame to the Frenet-Serret frame but it is defined when the second derivative of the curve vanishes. It has the same behavior as a parallel transport frame but is easier to compute and has the same accuracy. In this paper, we investigate the quasi frame and equations of non-light like curves in 3-dimensional Minkowski space E^{3}{1} and in 4-dimensional Minkowski space-time E^{4}_{1}. Furthermore, we show the quasi frame can be considered as a generalization of the Bishop frame in E^{3}{1} and E^{4}_{1}.

Code: # ICMSIT3-2022- PURE-25

Adomian Decomposition Method for solving nonlinear Sharma-Tasso - Oliver Equation

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Abstract: The aim of this paper is to introduce a semi analytical solution for nonlinear partial differential equations. We focus on mixed nonlinear partial differential equation Sharma-Tasso-Oliver equation STO. The Adomian Decomposition Method (ADM) played an important technique for solving nonlinear partial differential equations. The developed scheme for finding the solution of the considered problem is based at the search for a solution inside the form of a chain and on decomposing the nonlinear operator into a sequence in which the phrases are received from a polynomial generated from a spread of an analytic function which is known as Adomian polynomials. The given problem is discretized in both time and space directions. Two forms of the analytical solutions examined to check the precision and effectiveness of the presented method. It is very clear that the ADM introduce a solution for PDEs in a rapidly convergent series. The obtained series may provide the solution in a close form.

Code: # ICMSIT3-2022- PURE-26

Types of connectedness on multi bitopological spaces

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Abstract: Reptant of elements in any collection of sets become essential in mathematics, especially, in topology. The main attempt in this paper is to introduce new types of multiset bitopological spaces in terms of multiset relations. The multiset connectedness on these new types of spaces will be introduced and some of their properties are studied. In this case, we investigate the concepts of multiset separated, multiset quasi separated on multi bitopological spaces. Finally, we apply multiset connectedness on the stands of DNA and RNA to examine their mutation.

Code: # ICMSIT3-2022- PURE-27

some new generalized inequalities of Hardy and Littlewood type on alpha-conformable derivatives on time scales

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Abstract: In this study, we prove some new dynamic inequalities of Hardy and Littlewood type on alpha-conformable derivatives time scales. The results as special cases contain the integral inequalities due to Hardy and the discrete inequalities due to Hardy and Littlewood. Our main results are proved by using some algebraic inequalities, the H¨older inequality, the integration by parts formula and chain rule on alpha-conformable derivatives time scales.

Code: # ICMSIT3-2022- PURE-28

Approximate solutions for Nash differential game

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Abstract: In this paper, we are concerned with an open-loop Nash differential game. The necessary conditions for an open loop Nash equilibrium solution are obtained, also the existence for the solution of the dynamical system of the differential game is studied. Picard method is used to find an approximate solution and the uniform convergence is proved. Finally, we constructed figures for the analysis of the differential game. These results can be applied between economic and financial firms as well as industrial firms.

Code: # ICMSIT3-2022- PURE-29

Graph Design for Data Authentication Over Insecure Communication Channel

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Abstract: Information authentication is a critical issue in communication systems. The purpose of information authentication is to authenticate transmitted information. Thus the receiver can confirm that the message really sent from an authorized sender and is not a fake or substituted message from an opponent. Such authentication is achieved using authentication codes. Authentication codes are used in communication channels where the transmitter and the receiver there is an opponent who may play either impersonation attack or substitution attack. By an impersonation attack we mean that the opponent transmits a message through the channel to the receiver and hopes the receiver will accept it as authentic. By a substitution attack we mean that after the opponent observes a message sent by the transmitter, he replaces that message with another one and hopes it will be accepted as authentic from the receiver. For each of these kinds of attacks, there is an associated probability that the opponent will success to deceive the receiver. That are the probability of a successful impersonation attack P_1 and the probability of a successful impersonation attack P_2. For more security of the communication system, it is proposed to construct an authentication code with small values of P_1 and P_2. In this paper, we present an approach for design a graph message authentication code. This approach constructs a set of mutually orthogonal decompositions of a regular graph H by a graph G. Imposing certain conditions on H and G, we build a combinatorial design on H that yields to an authentication code with low probability of impersonation attack and of substitution attack. Moreover, we prove that such probabilities are related to the order of the graph H.

Code: # ICMSIT3-2022- PURE-30

A singularly perturbed vector-bias malaria model incorporating bed net control

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Abstract: A malaria transmission disease model with host selectivity and insecticide treated bed nets (ITNs), as an intervention for controlling the disease, is formulated. Since the vector is an insect, the vector time scale is faster than the host time scale. This leads to a singularly perturbed model with two distinctive intrinsic time scales, two-slow for the host and one-fast for the vector. The basic reproduction number $\mathfrak{R}_0$ is calculated, and the local stability analysis is performed at equilibria of the model when the perturbation parameter $\epsilon > 0$. The model is analyzed when $\epsilon \to 0$ using asymptotic expansions technique. The results show that if over 30% of humans use ITNs, then $\mathfrak{R}_0$ can be reduced below 1, and hence, malaria disease can be eliminated. In addition, the dynamics on the slow surface indicate that the infected vectors decay fast when $\epsilon = 0.001$ according to the numerical simulations.

Code: # ICMSIT3-2022- PURE-31

A new Approach to Soft Bitopological Ordered Spaces

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Abstract: The main aim of this paper is to initiate the notion of soft bitopological ordered space, which is a partial order relation coupled with the structure of a soft bitopological space. Some concepts such as increasing (decreasing, balancing) pairwise open (closed) soft sets are presented and their main properties are studied in detail. The notions of increasing (decreasing, balancing) total (partial) pairwise soft neighborhoods and increasing (decreasing) pairwise open soft neighborhoods are introduced and the relationships among them are illustrated. Finally, we define the concept of increasing (decreasing) pairwise soft closure (interior) and investigate the relationships between these concepts with the help of examples.

Code: # ICMSIT3-2022- PURE-32

T-Kolmogorov numbers for relatively bounded operators

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Abstract: In this work, we introduce a definition of T Kolmogorov numbers for a T relatively bounded operator A, where T is a closed operator and study some of its properties. For example we show that a T bounded operator is relatively T compact if and only if its sequence of T- Kolmogorov numbers converges to zero and get many interesting results about T Kolmogorov numbers.

Code: # ICMSIT3-2022- PURE-33

Comparative Studies for solving Ill-Posed Problems

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Abstract: Comparative Studies for solving Ill-Posed Problems N. H. Sweilam, E. M. Mansour Abstract: Inverse problems and ill-posed problems have been an emerging field over many years. The importance of this field is due to a wide class of applications such as medical imaging, including computerized tomography, thermoacoustic imaging, electrical impedance tomography. Many of these applications are nowadays assigned to the area of imaging. Tikhonov initiated the research on stable methods for the numerical solution of inverse and ill-posed problems. In the early days of regularization mainly linear ill–posed problems have been solved numerically. The theory of regularization methods developed systematically. Until the eighties there has been success in a rigorous and rather complete analysis of regularization methods for linear ill-posed problems. Fractional Tikhonov regularization methods have been recently proposed to reduce the over smoothing property of the Tikhonov regularization in standard form, in order to preserve the details of the approximated solution. In this talk, a comparative study of some methods will be introduced to obtain the best approximate solutions for some ill-posed problems. These methods are Tikhonov regularization method, truncated singular value decomposition regularization method, fractional Tikhonov regularization method and projected fractional Tikhonov regularization method. Some test examples are given to show these method's effectiveness.

Code: # ICMSIT3-2022- PURE-34

Strong Semilattices of Topological Fibrewise Groups

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Abstract: In this paper, we introduce the concept of fibrewise topological partial group and discuss some of its basic properties. Also, we introduce the notion of strong semilattices of topological fibrewise group and discuss the product and the quotient in strong semilattices of topological fibrewise group.

Code: # ICMSIT3-2022- PURE-35

Soft Generalized (β, ω)-closed Set in Soft Topological Space

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Abstract: In the present paper, we introduce a new concept of soft sets called soft g (β, ω)-closed sets. Also we study the basic properties of this new concept and we investigate the relation between soft g(β, ω)-closed sets and some of the other soft sets/ Finally we introduce the concept of soft g(β, ω)-continuous map and we study the relationship between the new concept and some of the other types of soft continty.

Code: # ICMSIT3-2022- PURE-36

First- order nonlinear integro-differntial equations with nonlocal condition

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Abstract: The existence of solution of a functional of first -order nonlinear integro-differntial equations with finite and infinite boundary conditions are studied. The uniqueness of the solution and continuous dependence of the unique solution on both the nonlocal parameter and the initial data are given. For illustrating the main result, an example is presented.

Applied Mathematics

Code: # ICMSIT3-2022- APP -1

The Dynamical Motion of a Rigid Body with a Spherical Cavity: Modeling and Analysis

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Abstract: In this work we investigated the rotational motion of a rigid body with a cavity that has a form that is nearly spherical and is surrounding by a viscous, incompressible fluid under the influence of a viscous fluid besides the action of a gyrostatic moment vector about the principal axes of the body. It is assumed that the Reynolds number has a modest restricted value due to the high velocity of the fluid. The governing system of motion is derived and the averaging of the Cauchy problem of this system is analyzed. Through several transformations and plotted graphically, the analytic solutions are derived to demonstrate the positive influence of the physical body's parameters on the motion. The stability of these solutions is examined through their phase plane diagrams. In light of the efficiency of a gyrostatic moment on the considered motion, new results of this work have been achieved. The significance of this work stems from its numerous uses in everyday life, particularly in vehicles that hold liquids, such as aircraft, submarines, ships, and other vehicles. Moreover, it is also used in engineering applications that depend on the gyroscopic theory.

Code: # ICMSIT3-2022- APP -2

On the vibrational motion of a subjected triple rigid body pendulum's system to external moments

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Abstract: This article investigates the vibrational motion of a 3DOF dynamical system consisting of a triple-rigid-body-pendulum under the action of harmonically external moments. Lagrange's equations are utilized to derive the governing system of motion. The approximate analytic solutions are obtained using the approach of multiple scales. Various resonance cases have been classified, and modulation equations have been attained. The numerical results of the governing system are generated using the Runge-Kutta method of the fourth order and compared with the analytic one. The Routh-Hurwitz criteria are utilized to study the stability and instability zones. The importance of this work is due to the applications of the obtained results in engineering vibrational control applications.

Code: # ICMSIT3-2022- APP -3

The dynamical motion of a symmetric rigid body for the case of irrational frequencies

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Abstract: The three-dimensional motion of a rigid body around a fixed point similar to Lagrange's case under the influence of a gyrostatic moment and a Newtonian force field is investigated. It is restricted that, the body's center of mass is somewhat offset from the main axis of dynamic symmetry. The periodic solutions for the case of the body's irrational frequencies are obtained using the Poincaré method of small parameters. Euler's angles are obtained to describe the body's position at any given time. The graphical representations of the gained solutions and Euler's angles are presented to show the good effect of the applied moments and forces on the motion of the body.

Code: # ICMSIT3-2022- APP - 4

Studying the motion of a 3DOF dynamical system near resonances

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Abstract: In this study, the nonlinear motion of a double pendulum connected with an un-stretched arm, in which its pivot point moving along an elliptical path with a constant angular velocity is investigated. The motion is considered under the action of linear force acting on the pendulum arm which is connected to a damped harmonic spring. The method of multiple scales is used to solve the equations of motion. In view of the explored resonance cases, the conditions of solvability for the solutions at steady state are achieved. The comparison between the achieved results and the numerical ones shows that they are in high consistency.

Code: # ICMSIT3-2022- APP -5

Studying the influence of an energy harvesting device on a vibrating dynamical model Forces.

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Abstract: This research focuses on energy harvesting and vibration reduction in a spring-pendulum dynamical system, where the structure of the pendulum is altered using a separate electromagnetic harvesting mechanism. The governing equations are obtained using Lagrange's equations and solved approximately using the multiple scales method up to the third approximation as novel and precise results. In light of the graphical plots, the time behavior of the solutions, modified amplitudes, and phases are investigated and analyzed. The stability and instability zones of are investigated, in which the system's behavior is stable for a wide range of used parameters. Due to the usage of control sensors in industrial applications, construction, infrastructure, vehicles, and transportation, this model has recently gained importance.

Code: # ICMSIT3-2022- APP -6

Modeling and stability analysis of a damped auto-parametric pendulum's model

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Abstract: In this work, we study the dynamical motion of a damped auto-parametric pendulum with three degrees of freedom. The kinematic equations of the system are derived according to its generalized coordinates and by using Lagrange's equations. Multiple scale method is used to obtain solutions to the governing equations up to the approximate third order. At the same time, the solvability criteria and modulation equations of primary resonances are studied. The nonlinear stability method is used to analyze the stability of the system in terms of different parameters. The time histories of the amplitudes and phases of the system are presented in some graphs to characterize the motion of the system at any given event.

Code: # ICMSIT3-2022- APP -7

On the motion of a nonlinear 3DOF dynamical system in an elliptic trajectory

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Abstract: This article investigates the motion of a nonlinear damped spring pendulum connected with a linear damped absorber under the influence of external force and moment. It is considered that the pendulum pivot point moves in an elliptic trajectory with constant angular velocity. The equations of motion are obtained applying the Lagrange's equations and solved approximately utilizing the multiple scales technique. The solvability conditions are obtained in view of the resonance cases. The stability areas and the instability ones are examined utilizing the criteria of Routh-Hurwitz. Time histories of the solutions and resonance curves are plotted to show the influence of several parameters on the dynamical motion. The importance of this work is due to its great uses in various engineering applications.

Code: # ICMSIT3-2022- APP -8

The optimal deceleration for a rotation motion of asymmetric rigid body

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Abstract: The problem for a minimum time of the 3D slowing rotatory motion of asymmetric rigid body under the action of a rotatory moment of viscous friction and a gyrostatic one is studied. It is taken into account that the center of mass of the body coincides with the origin point of two Cartesian frames. The law of optimal control for the slow body's rotation is investigated, the deceleration time and phase paths are calculated. The new results are gained and represented graphically for two new cases to expose the good effects of the gyrostatic moment. The comparison of our findings with those from earlier research reveals a striking degree of consistency in the lack of the gyrostatic moment's influence. So, the attained results generalized those that were gotten in previous works. This work is relevant because of its practical applications, particularly for the gyroscopic theory applications.

Code: # ICMSIT3-2022- APP -9

Simulating the behavior of a 2DOF dynamically controlled absorber

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Abstract: The planar motion of a 2DOF dynamical model consisting of a connected tuned absorber with a simple pendulum is examined. It is considered that, in the presence of a harmonic excitation moment, the pendulum's pivot moves in a Lissajous trajectory with a stationary angular velocity. The motion's governing system is derived using Lagrange's equations in terms of the model's generalized coordinates. The strategy of multiple scales is used to obtain the system's approximate solutions up to higher order of approximation. All resonance cases are categorized, and the relevant modulation equations are obtained by simultaneously examining two of them. In terms of solvability restrictions, the steady-state solutions are studied. All potential fixed points at steady and unstable states are identified and graphed using Routh-Hurwitz conditions. The resonance curves as well as the dynamic behavior of the motion's time histories are depicted. In order to determine the beneficial effects of different parameters on the motion, regions of stability are studied by glancing at their graphs.

Code: # ICMSIT3-2022- APP -10

Periodic solutions and stability for a sextic galactic potential function

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Abstract: In the current paper, the periodic solutions for the Hamiltonian function governing the sextic galactic potential function has been introduced in accordance with two different methods. The first method is applied using averaging theory of first order. We analyze the sufficient conditions on the parameters for the stability. We also introduce the numerical examples of families of periodic orbits. The second method is studied using Lyapunov's theorem for the holomorphic integral, where the periodic solutions depend on the type of the equilibrium points.

Code: # ICMSIT3-2022- APP -11

Modeling, stability and stick-slip behavior analysis of melting plastic hydraulic injection system

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Abstract: A hydraulic power injection machine is designed to inject molten plastic into a specific mold using a pushing screw. This machine is available at an automotive replacement parts plant. One roller supports and secures the cantilever-style heavy-duty screw injector. There is an obvious necessity for vibration analysis on the roller support. A mass spring damper model has been developed to further comprehend and study the vibration behavior of this injection system's friction-generated vibration mechanism. A mechanical mode with two degrees of freedom (DOF) is being developed to help researchers better understand the dynamic properties of the Plastic Hydraulic Injection System (PHIS) mechanism. The system's stability and SS behavior are next investigated by calculating the critical variability speediness and critical SS speed. A simulation study was carried out to evaluate the effect of various parameters of the system on its stability and on the behavior of the SS motion. This work's numerical imitation results will be useful in further developing the PHIS mechanism.

Code: # ICMSIT3-2022- APP -12

On the nonlinear rotatory motion of a charged gyrostat

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Abstract: This work investigates the 3-D rotary motion of a charged rigid body (gyro) about a fixed point close to Lagrange case. Some forces and moments are considered to be influencing on the gyrostat such as a Newtonian force field in addition to perturbing, gyrostatic, and restoring moments. The body is assumed to have an initially extremely large angular velocity along the direction of the axis of dynamical symmetry and the perturbing moments are smaller than the moment of restoring. The averaging method is used to obtain the averaging system of motion in view of these conditions. The angles of precession and nutation are evaluated asymptotically. The graphical performance of these angles is plotted to display the good influence of the applied moments on the motion. The governing system of motion and these results are represented in other plots. The significance of the current work is due to its various implementations in the theory of gyroscopic motion especially in the design of aircraft, spaceships, and submarines because they are mainly responsible for directing these vehicles.

Code: # ICMSIT3-2022- APP -13

Mathematical aspects of extensive and nonextensive exp and log distributions

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Abstract: In statistical physics, the dominance of Boltzmann- Gibbs distribution endow an impression that this would be the only statistical approach. The large class of statistical approaches refer to various types of nonextensivity. For instance, log and exp distributions play a crucial role in extensive and nonextensive statistical mechanics. Emerging in physical system, Maxwell-Boltzmann statistics (MB) defines extensive entropy which relates the number of micro -states to thermodynamic quantity and Boltzmann distribution which is nothing but a probability distribution. The various types of nonextensive statistics violate the fourth shannon -Khinchen additivity. We compare between log and exp distributions in MB, Tsallis, and generic statistics and conclude that their compatibility exclusively depending on the nonextensivity parameters.

Code: # ICMSIT3-2022- APP -14

Eigenstructure Assignment for A Dynamic Electric Power System

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Abstract: This paper considers the eigenstructure assignment problem for a dynamically electric power system. The dynamic Electric Power system considered is a static synchronous compensator “STATCOM”. The applied approach provides a way of constructing the state feedback gain matrix to satisfy a certain prescribed performance. This paper presents a new method for developing a parameterized feedback matrix that assigns a closed-loop prespecified set of eigenvalues. The proposed synthesis procedure is twofold, it simultaneously improves overall system performance, and it yields a class of controllers contributing uniformly to the assignment process.

Code: # ICMSIT3-2022- APP -15

The scattering surface waves of buried object between two piezoelectric layers

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Abstract: The present study investigates the effect of a mechanical load on pattern of the scattered waves by a defect on the interface of two piezoelectric layers, where the size and location of object are predetermined. The resultant of this step is reduced to two systems, one system for each layer, of coupled boundary integral equations utilizing the generalized Green's identity and the reciprocal work theorem. The Boundary Element method supported by Green's Functions is employed to solve the formulated integral equations. Hence, the deformation and electric potential over each half of the object's contour are evaluated. A series of practical examples to analyze the pattern of such waves over the surface for various shapes are presented.

Code: # ICMSIT3-2022- APP -16

The Killing symmetries of a perfect fluid ball representing a neutron star

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Abstract: The problem of modelling the internal structure of neutron stars is of particular importance to astrophysics. Metric solutions of the Einstein field equations used for such a purpose must satisfy certain physical conditions. In this work, we study one of the most recent such solution and find its Killing vectors and symmetries. The solution assumes the matter-energy content to be that of an ideal gas and matches to the standard Schwarzschild solution at the boundary.

Code: # ICMSIT3-2022- APP -17

Long-period dynamics of space debris in the GEO region

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Abstract: Derelict satellites, rocket bodies, and pieces thereof have been left on orbit. These space debris have been increasing in numbers and simulations of their future evolution have shown that this increase might continue due to collisions between objects. Studying the long-term dynamical evolution of space debris help us to avoid collision risks caused by these objects. In this work we studied the long-term evolution of space debris orbits, in GEO region, under the effect of natural perturbations. The perturbations considered are the Earth's gravitational field and solar radiation pressure as well. To better understanding the long-period dynamics we carried out several numerical explorations on space debris with moderate area-to-mass ratio. We found that zonal potential and solar radiation pressure play an important role in the dynamics of the problem.

Code: # ICMSIT3-2022- APP -18

Equations of Motion for Spinning Fluids in Bi-metric Type Theories of Gravity

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Abstract: Recently, type theories of gravity have been performed to tackle the discrepancy found in General theory of relativity. Due to its inability to examine precisely the behavior of particles in strong gravitational fields, alternative theories of gravity have been proposed. One of these theories is bi-metric theory of gravity. However, there is not a unique version of it. From this perspective, a class of bi-metric theories has been found. Throughout this description, we are going to describe the behavior of spinning fluid orbiting a strong gravitational field such as a spinning fluid orbiting SgrA*. The problem of its stability is going to be studied using its corresponding deviation tensor equations.

Code: # ICMSIT3-2022- APP -19

NEW RESULT OF POSITIVE SOLUTIONS FOR FRACTIONAL PANTOGRAPH PROBLEM

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Abstract: In this talk, we study the positive solutions of pantograph fractional differential equations. We convert the pantograph fractional differential equation into an equivalent integral equation. Using the Schauder xed point theorem and the method of upper and lower solutions, we showed the existence of a positive solution of this equation. The Banach xed point theorem is also used to prove the existence of a unique positive solutions

Code: # ICMSIT3-2022- APP-20

A Novel Approach in Examining Nonlinear Azimuthal Instability of Walters' B Viscoelastic Fluids Subjected to a Uniform Axial Rotation

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Abstract: A nonlinear temporal instability of an azimuthal cylindrical interface between two viscoelastic fluids of Walters' B type in permeable media is analyzed in this paper. A uniform azimuthal electric field (EF) has an impact on the rotating system. In the procedure, the boundary conditions (BC) are supplied in a nonlinear form and the nonlinearity is achieved by resolving the linearized governing evolution equations. The viscous potential flow (VPF) is employed to speed up the mathematical processing. The analysis of the boundary-values problem yields a nonlinear characteristic equation for the cylindrical interface displacement. An inventive scheme that is based on non-perturbative methodology is developed to accomplish stability estimation. The investigation of this problem was motivated by a growing interest in a number of engineering and practical physics applications. A hybrid Rayleigh-Helmholtz oscillator is represented by the nonlinear characteristic polynomial. The latter solutions of the obtained equation are validated using Runge-Kutta of the fourth order (RK-4). A set of physical properties with no dimensions are verified by the investigation.

Code: # ICMSIT3-2022- APP-21

Stabilization of Stationary Motions of a Gyrostat with a Cavity Filled with Viscous Fluid

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Abstract: This work focuses on the spherical motions around the center of mass of a single-rotor dynamically symmetrical gyrostat with a spherical cavity, just filled with highly viscous fluid, this body is acted upon by a gyrostatic moment, in which the third component is different from zero, is studied. Numerical results of the governing system are obtained applying the fourth-order Runge–Kutta method and represented in other plots. The significance of this work is focused on the great applications in the field of submarines and gyroscopes industries.

Code: # ICMSIT3-2022- APP-22

Life span of vortical structures in three-dimensional isotropic turbulent flow

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Abstract: In the recent study, an isotropic turbulent flow field is simulated using the lattice Boltzmann method (LBM) in periodic boxes with a resolution of 128^3. Vortical structures of various sizes in the tubular form are identified. Some of such vortices are extracted, isolated at a specific threshold value, and then tracked from birth to death. Statistical characteristics of the vortical structures are calculated such as volume, length, and radius, and then compared to the Kolmogorov micro-scale η, integral length scale l-0, and Taylor micro-scale λ which are the standard length scales of turbulent flows.

Code: # ICMSIT3-2022- APP-23

Rubber Sheet Geometry in Designing Process

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Abstract: In this paper, we study a new model of geometric topological structures which called Möbius surface. In addition, some different geometrical applications in architectures are studied and developed.

Code: # ICMSIT3-2022- APP-24

Quantum dynamics of three two-level atoms interacting with one mode of electromagnetic field in the presence of detuning parameter

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Abstract: This manuscript studies the dynamics of three two-level atoms interacting with a single-mode electromagnetic field. The analytical solution of this model is obtained using the Schrödinger equation. The wave function is obtained under the specific initial conditions of the atoms and the field. The effect of the detuning parameter and the coherent parameter on the atomic inversion, entanglement, the Husimi quasi distribution Q-function, and the correlation function and coherence is investigated.

Code: # ICMSIT3-2022- APP-25

Fuzzy Preventive Maintenance

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Abstract: The performance of an engineering system depends not only on its design and operational environment and usage intensity but also on the maintenance carried out over an extended time period. this paper studies three types of fuzzy preventive maintenance policies: aperiodic inspection policy, age-replacement policy, and block replacement policy for a system consisting of one component with fuzzy costs. A new algorithm depending on α-cut technique is introduced to study the behavior of the fuzzy average cost per unit time. Also, we get the fuzzy optimal age T and the corresponding fuzzy minimized value of the cost rate for the three models. Numerical examples are given for the three maintenance models to demonstrate the introduced analysis algorithm.

Code: # ICMSIT3-2022- APP-26

Study the influence of some external forces on the rotational motion of a rigid body

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Abstract: In this work, we are going to examine the rotational motion of a rigid body about a fixed point (similar to Lagrange's case) in which it is incurred to a gyrostatic moment in addition to the attraction of a Newtonian force field. It is assumed that the body is rapidly rotating around one of the major or minor principal axes of the inertia ellipsoid.

Code: # ICMSIT3-2022- APP-27

Peristaltic flow of viscous nanoparticles Al2O3/water nanofluids inside a vertical cylindrical tube

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Abstract: The behavior of some peristaltic flow for some liquids in a vertical cylindrical tube is studied. In this paper, the peristaltic nanoparticles Al2O3/water nanofluids flow is studied. The mathematical model is formulated by mass, momentum, and heat equations. The problem is solved analytically to estimate temperature, velocity and pressure gradient distributions with nanoparticle Al2O3. The temperature, nano fluid velocity, and pressure gradient are affected by void fraction of nanoparticles, Gasthof number and amplitude ratio.

Code: # ICMSIT3-2022- APP-28

The Effect of Peristaltic Motion on Nanoparticles CuO/Water Nanofluids Inside a Vertical Cylindrical Tube

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Abstract: In this paper, the peristaltic Nanoparticles CuO/Water Nanofluids are studied under the effect of peristaltic motion. The mathematical model is formulated by mass, momentum, and heat equations. The problem is solved analytically in terms of temperature, velocity and pressure gradient distributions under the effect of amplitude ratio, void fraction of Nanoparticles. Results introduced the behavior of temperature, Nanofluid velocity and pressure gradient under the effect of some physical parameters.

Code: # ICMSIT3-2022- APP-29

New Treatment of Wave Solutions of The Nonlinear Burger Equation

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Abstract: The unsteady nonlinear Burger equation is converted to the linear diffusion equation based on the concept of linear velocity operator$(\hat{v} \cdot \nabla)$. For a first time, the obstacle in the nonlinear term is solved in the current problem. The simplest analytical solutions of linear Burger equation are obtained. Moreover, results prove the validity of the proposed model.

Code: # ICMSIT3-2022- APP-30

PROPAGATION OF INTERNAL GRAVITY WAVES ON STAGGERED FINITE- DIFFERENCE MODEL

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Abstract: Finite-difference models are widely used for numerical solutions of wave propagation and reflection in various physical settings, including acoustics, oceanography, seismology, and electromagnetism. Here the two-dimensional equations of internal gravity waves are investigated using second-order finite-difference staggered grid formulation, which is called the Arakawa C- grid in fluid dynamics. The waves propagation is investigated at three different settings which are propagation in unbounded domain, propagation along a straight channel, and reflection of internal waves at a planar wall. With time-harmonic waves, all physical quantities are quantified analytically. The convergence rate of the discrete dispersion relation for the unbounded domain on the unstaggered Arakawa A-grid and the staggered C-grid is also compared for verification. For all settings, the dispersion relation of waves is recovered to second-order in grid spacing, as expected when second-order central differencing is used to discretize the equations. While, for wave reflection setting, the reflected wavevector and wave amplitude are recovered to second- order in grid spacing. It is showed that the properties of internal gravity waves are sufficiently retained on the C-grid. The stimulation of a vertically bounded internal gravity waves with a great mode of waves requires small grid spacing to sustain the convergence rate.

Probability & Statistics

Code: # ICMSIT3- 2022-STA-1

Laplace Transform Approach for the Testing Non-Parametric Class (NBUCmgf) of Life Distribution

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Abstract: During the last few decades, most of the approaches developed for dealing with life testing problems were vastly different from those used in the related but broader subject of Laplace transform methodology. This article shows how to use the Laplace transform approach to solve life testing problems, and the result is simplified processes that are asymptotically similar to or better than traditional ones. Based on Laplace transform approach, a new test statistic to be derived for testing exponentiality against new better than in the increasing convex order at the moment generating function (NBUCmgf) class of life distribution. This test's asymptotic efficiency is calculated and compared to those of other tests. For both censored and non-censored data, the percentiles of this test statistic are tabulated. Finally, examples from various fields are presented to demonstrate how the suggested test might be applied in practice.

Code: # ICMSIT3- 2022-STA-2

Proportional Hazard Bivariate Kumaraswamy Model applied on Fish Mercury Concentration

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Abstract: International advisory bodies have developed guidelines for testing mercury and aquatic items to protect human health and international trade. The mercury absorption in fish has a significant effect on human health. In this paper, a new construction via the proportional hazard rate model with Kumaraswamy marginal is introduced and applied to mercury concentration in fish bodies. Some properties of this bivariate distribution are derived, such as joint density function, marginal density functions, conditional density functions, moments, and reliability measures. Estimation of the parameters is investigated by the maximum likelihood, method of moments, and inference function for margins estimation methods. In the simulation study, the performance of estimators depending on their estimation methodologies is compared. Finally, a comparative study of the proposed BKPH with several bivariate Kumaraswamy distribution via goodness of fit criteria was introduced. The results of the study proved potentiality of BKPH model and best fitting on mercury fish absorption data.

Code: # ICMSIT3- 2022-STA-3

Constrained Probabilistic Multi-Source Inventory Model by Decreasing Holding Cost with Weibull and Lindley-Weibull Distributions

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Abstract: The main objective of this paper is to minimize the expected total cost under restriction on expected decreasing holding cost for probabilistic continuous review multi-item multi-source inventory model using a Lagrange multiplier technique. The demand is a continuous random variable. The optimal order quantity and the optimal reorder point for the i^th item and s^th source which achieve the objective when lead time demand follows Weibull and Lindley-Weibull distributions are obtained. Also, an application is analyzed and reach the goal of minimizing the expected total cost.

Code: # ICMSIT3- 2022-STA-4

Algorithm of Estimating Three-Parameters Distribution and its application in banks

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Abstract: In this paper, a new estimation method named Percentile Root (PR) was presented with an application in ATM transactions. The statistical properties of the distribution are exploited by PR to obtain the estimated parameters, ensuring the efficiency of the method. The significant results of PR method are compared with Maximum Likelihood Estimation (MLE), and it is clear that the PR method is simple in coding by a computer and provides precise results.

Code: # ICMSIT3- 2022-STA-5

Bayesian and Non-Bayesian Estimation for Burr Type X under Trimmed Samples with Application of Glass Fibers

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Abstract: This paper investigates the estimation of unknown parameters of Burr type X distribution based on trimmed data. First, we evaluate scale as well as shape parameters through the maximum likelihood estimation (MLE) and we use the Newton-Raphson method to obtain the close form of the parameters under MLE. Subsequently, the Burr type X's parameters are obtained by using linear exponential (LINEX) loss function, Noninformative prior (NIP), general entropy (GE) loss function, and informative prior (IP). Furthermore, we use Markov Chain Monte Carlo (MCMC) simulation to compare between MLE and Bayesian estimators. Finally, real data about glass fibers is supplied for illustrative of suggested inference methods and we conclude that IP is the best method for the estimation of parameters.

Code: # ICMSIT3- 2022-STA-6

Statistical inference to the lifetime parameters of Flexible reduced logarithmic - inverse Lomax distribution under Hybrid type-II censored data to bladder cancer

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Abstract: In this paper, the statistical inference procedures have been discussed to the parameters of the flexible reduced logarithmic-inverse Lomax distribution under the Type-II hybrid censoring scheme. We obtain the maximum likelihood and Bayesian estimates for the unknown parameters. Real data for patients with bladder cancer correlates well with the proposed distribution. The survival and hazard functions were estimated to extrapolate the results that contribute to the study of failure analysis of model patients under study. The performance of the Bayesian estimators for the model parameters was compared with the maximum likelihood approaches through a simulation study. In addition, sample Bayesian prediction intervals are explored based on the failure real data set as an illustrative example. Finally, concluding observations are presented along with suggested recommendations that contribute to making good decisions regarding failure analysis under type-II hybrid censoring scheme.

Code: # ICMSIT3- 2022-STA-7

Statistical Inference under hybrid type II censoring scheme for the truncated Weibull Rayleigh distribution with application to COVID 19 data

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Abstract: In this paper, the estimation of three parameters the truncated Weibull Rayleigh distribution by maximum likelihood and bayes estimators when sample is available from hybrid type II censored scheme. In addition, symmetrical and a symmetric loss function like squared error and LINEX is obtained from Bayesian estimates. The Markov chain Monte Carlo (MCMC) technique is used to obtain unknown parameters estimates from Bayes estimation. An empirical study using a real data set for COVID-19 to evaluate the flexibility of the truncated Weibull Rayleigh (TW-R) under hybrid type II censoring scheme. A real data is Ötted well to the proposed distribution. Finally, the performance of the Bayesian estimators of the model parameters has been compared with the maximum likelihood approaches through a simulation study.

Code: # ICMSIT3- 2022-STA-8

Comparison Vector Autoregressive and Long Short-Term Memory for forecasting Air Pollution Index in Jakarta

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Abstract: The Air Pollutant Index (API) is a number without units that describes the condition of ambient air quality at a particular location. The purpose of the API is to provide the convenience of uniformity of ambient air quality information to the public at a certain location and time. API monitoring is carried out based on meteorological data that affect ambient air concentrations. On the DKI Jakarta SILIKA website, there is no feature to see ISPU predictions even though this feature is useful for the community. The advantage of predicting ISPU is that the public can anticipate early related to air quality conditions that will occur, including air pollution. In the time series study, multivariate time series predictions were made on the correlated ISPU parameters. Conventional methods such as Vector Autoregressive. The VAR model is a development of the Autoregressive (AR) model where more than one endogenous variable is used in the VAR model. Artificial Intelligence forecasting methods such as Long Short-Term Memory can be used to forecast multivariate time series. The results showed that the LSTM model had the smallest RMSE value for the prediction of pm10, which was 15.038, and pm25, which was 15.437. Modeling for multivariate time series can be done with conventional methods such as VAR. However, in this study, a deep learning algorithm, namely Long short-term memory, was tested to solve multivariate time series cases.

Information Technology

(IT)

Code: # ICMSIT3- 2022-IT-1

Vision-based Human Behavior Analysis in Video Sequences

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Abstract: In this paper, we propose a novel approach to analyze and model the human crowd behaviors using Hidden Markov Model in video sequences. Firstly, each frame in the video stream is segmented into saptio-temporal flow blocks to marginalize the flow field. Secondly, the flow features for each flow-block are extracted using Gaussian Mixtures Model in conjunction with k-means algorithm to parameterize the flow field. Finally, the generative Hidden Markov Model is employed one for each flow-block and is learned from the sequence of dynamic patterns to classify each flow block as normal and abnormal. Experiments are conducted on own realistic Data set (Hajj-Umrah Data Set) from crowd in the pilgrimage. Furthermore, the ground truth is employed to carry out the remaining issues and the evaluations are elaborated. Our experiments show promising results with no scarifying real-time performance for a wide range of practical crowd applications for both the normal and abnormal behavior in incoherent and cohesive crowded scenes.

Code: # ICMSIT3- 2022-IT-2

A Review of Android Malware Detection Approaches Based on Ontology

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Abstract: In recent years, ontology techniques have been concentrated on malicious software (malware) detection. Malware is any application with a harmful purpose. It can be written to interrupt regular activity, steal sensitive information, control the account and device without the user's awareness, or display infected advertising. Existing studies suggest that ontology is an effective and promising way to Android malware detection. This paper presents a summary of the current main ontology approaches and mechanisms for Android malware detection. Also, it identifies the advantages and limitations of each approach and discusses the important factors of ontology techniques for Android malware classification. Finally, this review will help further research by giving a complete picture of state-of-the-art ontology research on Android malware detection.

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A Comparative Study of Android Malware Detection Approaches Based on Ontology

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Abstract: In recent years, ontology techniques have been concentrated on malicious software (malware) detection. Malware is any application with a harmful purpose. It can be written to interrupt regular activity, steal sensitive information, control the account and device without the user's awareness, or display infected advertising. Existing studies suggest that ontology is an effective and promising way to Android malware detection. This paper presents a summary of the current main ontology approaches and mechanisms for Android malware detection. Also, it identifies the advantages and limitations of each approach and discusses the important factors of ontology techniques for Android malware classification. Finally, we proposed an ontology method to improve malware detection. It relies on detecting malware early at the design stage of the software, not the coding stage. This work will help further research by giving a complete picture of state-of-the-art ontology research on Android malware detection.

Code: # ICMSIT3- 2022-IT-4

A review on deepfake video creation and detection techniques

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Abstract: Rapid advancements in AI, machine learning, and deep learning over the past few years have produced new techniques and tools for manipulating media; images, audio, and videos. One such example of these manipulation techniques is deepfakes. Although the deepfakes technology has been employed for legal purposes; education, movie making, and entertainment, malicious people have misused it to spread propaganda and falsified information, create porn videos, and blackmail individuals. Face-swapping, voice cloning, and lip synchronization techniques are typically used to generate hyper-realistic and high-quality deepfake videos. Since deepfakes constitute a concern for the public, societies, and countries, several researchers have developed deepfake media detection methods. This paper introduces a review of deepfake video creation techniques, common deepfake video datasets, and recent state-of-the-art deepfake video detection methods.

Code: # ICMSIT3- 2022-IT-5

A Quantum Algorithm for Detecting Noisy Patterns in IoT Applications Based on Zidan's Model

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Abstract: Detecting whether received data from sensors are flipped due to environment effects is a vital requirement in many IOT applications. It is apparent that quantum computers can be more efficient for performing machine learning algorithms compared to traditional algorithms. We propose a novel quantum algorithm based on competitive learning and Zidan's model of quantum computing that classifies an input pattern provided by quantum sensors into one of two classes namely noisy, and not noisy. The proposed algorithm is a search algorithm that performs a competition between a set of predefined patterns stored in a quantum random access memory. Then it uses the second technique of Zidan's model to classify whether a given pattern is noisy or not with complexity O(ϵ^(-2)). The proposed algorithm is realized using IBM's quantum computer simulator on the dataset of the RCP of a risky nuclear reactor. The results show that the proposed algorithm outperforms compared to other state-of-the-art algorithms.

Code: # ICMSIT3- 2022-IT-6

A method for brain stroke detection based on tensor decomposition and CNN model

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Abstract: One of the maximum communal diseases amongst seniors is a brain stroke. The early discovery of stroke from MRI images naturally depends on the way of these images are represented. Traditionally, the MRI images are represented in a two-dimensional construction that ignore dependences among images. In addition, combining wholly features in these images needs further calculations and time consumed. This paper presents a technique to detect stroke from MRI images depending on using a tensor-based approach and modified LeNet Convolution Neural Network (CNN). First, the MRI images of individual patient are represented by a tensor, which capture dependences in the MRI images dataset of high order efficiently with accurate and reliable. Then, the tensor decomposition is used for reducing the representation by capturing multi-linear and multi-aspect structures, which helps to improve the classifier performance and accuracy. Finally, the reductant representation is passed to the modified LeNet model to learn the ideal representation and then check the person's illness; stroke or normal. The proposed technique is evaluated, and the experimental results show that the accuracy of classification up to 96%.

Code: # ICMSIT3- 2022-IT-7

Machine Translation based on Bi-directional Translation

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Abstract: The translation between different languages has an increasing importance due to the demand of information exchange, saving time of working people and technology transfer. This paper presents a bi-directional Machine Translation, an automatic system for English-Arabic and Arabic–English translation of scientific domain. According to bi-directional MT, the system consists of two subsystems. Each subsystem runs in one direction (either English to Arabic or Arabic to English) using transfer–based approach and using two tightly related knowledge bases. Each subsystem consists of three main modules responsible for analysis, transfer, and generation. In the analysis components, the sentence is read and listed, the parser builds the grammar for this sentence by calling morphological analyzer and produces the syntactic tree relying on English/Arabic dictionary. The transfer component involves two steps: lexical transfer converts units in source text to equivalent in the target text with the same features, and structure transfer builds a target tree structure relying on set of rules. This process is carried out with the help of a bi-lingual dictionary. The generation component provides the target language (source verification text) translation, which involves the synthesis grammar rules of Arabic/English and an Arabic/English dictionary. The present work reports our attempt in developing the translation process by developing new rules that will enhance the translation process. This system is implemented in Prolog language. Experiments on real sentences were performed. The ability of this system enhanced the result process and reduced translation error of scientific texts from 14% to 10% by discovering new rules of translation based on bi-directional try-and-error translation.

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Similarity Measure for Decision Making

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Abstract: Decision-making is the cognitive process that leads to choosing a belief or a plan of action from a variety of potential alternative possibilities. It could be both unreasonable and rational. The method of creating decisions is a form of reasoning that is predicated on the decision-values, maker's preferences, and beliefs. A decision is made at the end of every decision-making process, and that decision may or may not lead to action. This paper presents a comparative study between different methods that can give a decision for solving a problem in an information system. The first method depends on the distance function between any object and the optimal object in the information system. The summation of attribute values for each object is used for the second method. In the third method, we calculate the similarity matrix ratio. We applied our proposed methods to several examples and made a decision for each method. Finally, these findings are examined and utilized to develop decision-support guidelines that may be used to regulate the convergence rate of the consensus process when employing the compared three methods. Convergent criteria serve as the foundation for these recommendations. These methods expand the options of decision-making for researchers.

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