

Late.Digambarrao Bindu Smarak Samiti's

Digambarrao Bindu



Arts, Commerce & Science College

Bhokar, Dist Nanded - 431801

In Collaboration with

Swami Ramanand Teerth Marathwada University, Nanded - 431606

Organizes Online

International Conference on Artificial Intelligence in Mathematical and Chemical Sciences (ICAIMCS - 2025)

April 29, 2025 (IST 10:00 AM)

SOUVENIR BOOK

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I am pleased to know our Institute Digambarrao Bindu ACS College Bhokar, Nanded and Swami Ramanand Teerth Marathwada University Nanded are jointly organizing an "International Conference on Artificial Intelligence in Mathematical and Chemical Sciences" (ICAIMCS-2025) on 29th April 2025. On this occasion, our institute Digambarrao Bindu ACS College Bhokar is planning to publish a Souvenir.

The international conference will provide a platform to the delegates from reputed institutions and national laboratories to exchange their significant scientific expertise and achieve successful conclusions and outcomes. I am sure that the conference will see meaningful discussions and yield constructive results.

I extend my best wishes to the organizers of the international conference as well as to the participants.

Dr. Madhavrao Patil Kinhalkar

President Late. Digambarrao Bindu Smarak Samiti's, Bhokar, MS, India Ex. Minister, Govt. of Maharashtra, India



I am pleased to know that Digambara Bindu ACS College Bhokar and Swami Ramanand teerth Marathwada University Nanded are jointly organizing an International Conference on Artificial Intelligence in Mathematical and Chemical Sciences (ICAIMCS-2025) on 29th April, 2025. On this occasion, the College is planning to publish a Souvenir.

This international conference will provide a platform to the delegates from reputed institutions and national laboratories to exchange their significant scientific expertise and achieve successful conclusions and outcomes. I am sure that the conference will see meaningful discussions and yield constructive results.

I extend my best wishes to the organizers of the international conference as well as to the participants.

Dr. Shailendra Deolankar Directorate of Higher Education Maharashtra State, India



I am extremely delighted to know that Departments of Mathematics and Chemistry Digambarrao Bindu ACS College Bhokar in collaboration with Swami Ramanand Teerth Marathwada University Nanded are organizing an International Conference on Artificial intelligence in Mathematical and Chemical Sciences (ICAIMCS- 2025) on 29 th April 2025 and also bringing out a Souvenir on this occasion.

I appreciate that this Conference aims to discuss recent findings and new emerging trends in the field and intended to promote fruitful collaboration between various stakeholders and institutes by bringing together various scientists in inspiring surroundings. I, therefore, hope that the Conference will provide a great opportunity to budding researchers particularly in the local region to explore the new aspects and global relations and get ample scope to exchange views and thoughts besides presenting their research which will be of long term relevance.

l extend my best wishes for successful organization of the International Conference.

Dr. Manohar Chaskar Vice-Chancellor Swami Ramanand Teerth Marathwada University, Nanded



My dear friends, distinguished colleagues and brilliant delegates,

It is my privilege and pleasure to extend you all very warm greetings on behalf of organizing committee of ICAIMCS-2025 Bhokar. Also I wish you all a very happy. productive and fulfilling new year, 2025. I am very glad to share with you all that we are organizing this Online"International Conference on Artificial Intelligence Sciences (ICAIMCS-2025)", between 29 April 2025 . The scope of this conference is Artificial Intelligence and is having wide dimensions. The main objective of organizing such a global event is to bring all chemical, mathematical and Statistical researchers one a common forum. This will ensure that all the participants share their subject ideas and a single platform is made available for the interdisciplinary research. This is a rare opportunity for Chemist Chemical engineers, Mathematicians, Statisticians and Computor Scientists to put forth their problems on a common platform and ignite the young and potent minds from versatile orientations.

I sincerely hope that all the participants would experience a rare sense of intellectual fulfillment at the conclusion of this academic feast. I feel proud to announce that this conference has generated a tremendous response from scientific fraternity world over. The 100 plus registrations for this event.I appeal from this Chief Organiser desk to take full advantage of this big opportunity and exchange your knowledge, thoughts, ideas and opinions with fellow brilliant brains from across the globe.

Once again, I welcome you all !! With warm regards

ICAIMCS-2025, Chief Organiser and Principal Digambarrao Bindu ACS College Bhokar

Dr. Panjab Chavan

Principal

Digambarrao Bindu ACS College, Bhokar

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Mathematics

Some Applications of Artificial intelligence (AI) In Mathematical Sciences

Dr.Archana ,V.Bhosle

Abstract- The use of artificial intelligence (AI) tools in mathematical sciences is revolutionizing a wide range of areas, encompassing everything from symbolic computation to data analysis and optimization. These tools create new possibilities for addressing traditional mathematical challenges, provide enhanced insights from large datasets, and facilitate quicker and more precise simulations. As AI technology progresses, its integration within the realm of mathematical sciences are expected to strengthen, establishing it as an essential resource in both theoretical and practical mathematics.

Keywords: Artificial intelligence (AI), mathematical sciences, optimization.



Mathematics

Some Review on Use of Mathematics & AI in Stock Market

Santosh C. Rudrawar

Abstract: In this paper we discus on Mathematics plays a crucial role in the stock market, particularly in understanding financial concepts, evaluating investments, and developing trading strategies. Key mathematical concepts used in the stock market include compound interest, probability, averages and various financial ration like Return on Equity and Price/Earnings ratio. AI trading techniques possess a higher accuracy rate than traditional methods. It is due to their ability to analyze and learn from massive models have in built risk management algorithms that adjust portfolios based on real time data. It helps minimize potential losses.

Keywords: Basic Mathematics, Calculus, Martingales, AI techniques



Mathematics

Application Of Laplace Transform Method For The Solution Of General Fractional Order Differential-Difference Equation

Dr. Kulkarni Pramod Ramakant

Abstract- In this paper, we have applied the Laplace transform method to prove the existence and uniqueness of the solution of a non-homogeneous fractional differential-difference equation of a general fractional order α and difference order 1 with general initial conditions where the fractional derivative is in accordance with the definition of Caputo fractional derivative. A few examples are illustrated that support the result.

Keywords: Laplace transform, differential-difference equation, Caputo fractional derivative, difference Equation,



Mathematics

Qualitative Analysis of Nonlinear Fractional Integra differential Equation and its Application

Dr. S. B. Chavhan, Mr. Suraj D. Panchal

Abstract: In this paper, we will discuss some results on the existence and uniqueness of mild and strong solution of initial value problem of fractional order subjected to non-local conditions, by using the Bench fixed point theorem and the theory of strongly continuous cosine family. Moreover, we will discuss results on the existence and uniqueness of nonlinear fractional mixed Integra differential equations with non-local conditions, by using the Bench fixed point theorem and Semi group theory.

Keywords: Differential Eqaution, Nonlinear Mathematics.



Mathematics

Route Optimization for Garbage Collection in Chandur Railway by Using AI & Dijkstra's Algorithm

M. S. Palaspagar, P. P. Khade

Abstract: Unplanned waste collection causes environmental pollution, cost increment and large consumption of fuel. Optimized route planning is one of the most important factors in the smart waste management system. In this work, an optimal route planning model and algorithm based on Dijkstra's algorithm and AI application are proposed. To find the shortest path real-life parameters such as the bins' status (fill-levels), road congestion status, distance is considered. Data analysis is done based on the practical scenario. The proposed model is found more cost-effective and Eco friendly than the conventional model.

Keywords: Smart waste bin; smart garbage collection & management system, route optimization; Dijkstra's algorithm & AI technology, smart & green city.



Mathematics

Exploring Geometric Structures using Differential Geometry

Vaishnavi Tukaram Gayake

Abstract: This research explores the applications of differential geometry in understanding geometric structures. We investigate the properties of curves and surfaces, utilizing tools from differential calculus and topology. Our results demonstrate the significance of differential geometry in describing the intrinsic and extrinsic properties of geometric objects.

Keywords: Differential geometry, curves, surfaces, curvature, torsion, geometric invariants. Manifolds. Springer.



Mathematics

Mathematical Modeling of Non-Homogeneous Heat Conduction Problem in a Thin Circular Plate under Uniform Heat Source

Kishor R. Gaikwad

Abstract: This paper is concerned with the determination of temperature, displacement and thermal stresses in a thin circular plate defined as $0 \le r \le a, 0 \le z \le h$ under a steady-state temperature distribution, with uniform heat source g_0 (W. m⁻³). The fixed circular edge (r=a) is kept at temperature f(z), while the upper (z = h) and lower (z = 0) surfaces are kept at zero temperature. The governing heat conduction equation has been solved by using finite Hankel transform technique. The results are obtained in a series form in terms of Bessel's functions. As a special case, mathematical model is constructed for pure aluminum circular plate considered. The results have been computed numerically and illustrated graphically.

Keywords: Heat Conduction; Thin Circular Plate; Steady-State; Uniform Heat Source, Non-homogeneous.



Mathematics

Solutions of Fractional Kinetic Equations Including Generalized Multiindex Bessel Function via Sumudu Transform

D.D. Pawar and R.D. Kadam

Abstract: In this paper, we derive solutions for fractional kinetic equations using the Sumudu transform technique, incorporating the generalized Multiin-dex Bessel function $J^{(\xi j)n,\gamma,c}[z]$. Additionally, we present other significant asses. By utilizing the generalized Multiindex Bessel function to solve the fractional kinetic equation, the obtained solution is sufficiently general and can be effectively applied to derive both well-known and novel fractional kinetic equations.

Keywords:: Fraction Number, Bessel Function.



Mathematics

Graph Based decision making method using Soft Set Relations

Sayyed Jalil, Rahul Deshmukh

Abstract: In this paper, we describe a novel approach to analyzing and evaluating complex choice issues by utilizing graph representations of soft set relations in our choice-making method. By looking at the incoming and outgoing values of choices inside a graph-based framework, the suggested algorithm offers an organized method for determining the optimum option. This method may be adapted to a variety of decision-making models and is especially helpful for tackling issues in a variety of domains, including social decision-making.

Keywords: Soft Set, Decision Making Problem, Representation of Soft Set Relations, Directed graph.



Mathematics

Thermal Stress Analysis in Multilayer Composite Rod: An Exact Analytical Solution

B. B. Pandit, G. B. Mete

Abstract: A theoretical solution is proposed for thermal stress analysis of multilayered composite rod. The rod is under transient temperature field. A constant temperature is applied at initial edge and convection due to dissipation takes place at extreme edge. Initially the rod is kept at constant temperature. The orthogonal expansion technique is used to find the temperature of multilayer composite slab. The results are illustrated in the form of series solutions. The computed temperature, displacement and thermal stresses are presented graphically and interpreted technically.

Keywords: Analytical Solution, Composite Medium, Thermal Stresses, Orthogonal Expansion Technique.



Mathematics

Analyzing Methods for Solving Fractional Boundary Value Problems

V. D. Mathpati, B. B. Pandit

Abstract: Fractional boundary value problems (FBVPs) involving Caputo derivatives have gained prominence for their ability to model dynamic systems with memory and hereditary characteristics, commonly encountered in viscoelasticity, diffusion processes, and control systems. This paper presents a comprehensive analysis of Adomian Decomposition Method (ADM) & New Iteration Method (NIM) with emphasis on their theoretical basis, stability, convergence, and practical implementation. We have analysed solutions graphically.

Keywords: Fractional BVPs, Caputo's fractional derivative, Adomian decomposition method, New iterative Method.



Mathematics

Hamiltonian and Eulerian Nature of Power Graph of Some Finite Groups

Chetana V. Visave and Rajendra Deore

Abstract: The Power graph of a group *G* is a simple undirected graph P(G) with a vertex set V(P(G)) = G and two distinct vertices *x*, *y* are adjacent in P(G), if there exists some integer *m* such that $x = y^m$ or $y = x^m$. In this article, we discuss the Hamiltonian and Eulerian nature of power graph of some finite groups.

Keywords: Power Graph, Finite Groups.



Mathematics

Study of Soham Transform Using Time Scales and Its Applications

Mr. S. B. Bokare

Abstract: The Soham transform is the important integral transform used for solving differential and integral equations. The transform has extended for time scales. In this paper, we studied the d Soham transform for time scales and solve partial and integro dynamic equations without converting them into an ordinary dynamic equation. The existence condition for the Soham transform is given. Further, some basic Results, linearly property, Time scale and the convolution theorem are discussed. Finally, applications are given for solving boundary value problems, partial dynamic and jntegro-dynamic equations through examples.

Keywords: Laplace transform, Sumudu Transform, Time scale, Soham Transform



Mathematics

Artificial Intelligence in Transportation: An Overview

Dr. Dhanashri A. Munot

ABSTRACT: In this rapidly evolving digital era, Artificial Intelligence (AI) is playing a transformative role across various sectors such as industry, business, tourism, agriculture, entertainment, construction, and healthcare. At the core of all these sectors lies transportation, making it essential to integrate AI into transportation systems. While some argue that mathematics is vital for training the human brain to think logically and organize human thoughts and actions, it is this very power of mathematics that has given rise to sophisticated computational methods like AI, which simulate human cognitive processes. This article provides an overview of how AI can be applied to address numerous transportation challenges, including increased travel demand, traffic congestion, CO_2 emissions, pollution, public transport management, autonomous vehicles, road safety, and environmental degradation.

Keywords: AI, Traffic Observation.





Eigenvalues & Eigenvector: A Foundational

Renuka Dattatray Pawar

Abstract: In linear algebra Eigenvalue and Eigenvector are two extremely important mathematical concepts that are used to study many scientific and technical problems. Here, the definition of Eigenvalue and eigenvector, the method of finding them, and their importance will be explained. The aim is to provide basic information about these concepts and to prepare for further study of linear algebra, where they are used in various field.

Keywords: Eigenvalue, Eigenvector, Characteristic equation, linear algebra.



Mathematics

Fixed Point Result for a Pair of Mappings in b-Metric Space

Varsha D. Borgaonkar

Abstract: This paper aims to obtain the fixed-point theorems for a pair of mappings satisfying a contractive-type condition in a b-metric space. The advantage of the study is that the b-metric need not be a continuous function.

Keywords: B-Metric space, Fixed Point, Cauchy's Sequence.



Mathematics

Mathematics: The Backbone of Artificial Intelligence Evolution

Dr.Sandeep Awachar,

Abstract: Mathematics serves as the backbone of Artificial Intelligence (AI), offering the theoretical and practical tools required to model, train, and optimize intelligent systems. From the geometrical intuition underlying neural networks to the stochastic processes driving decision-making in uncertain environments, AI is deeply rooted in mathematical theory. This paper presents an in-depth exploration of the mathematical underpinnings that support AI methodologies, with emphasis on key mathematical domains including algebra, calculus, probability, statistics, information theory, and emerging mathematical fields. Additionally, it examines how mathematical reasoning contributes to state-of-the-art applications in computer vision, natural language processing, reinforcement learning, and ethical AI design. A forward-looking perspective on the role of mathematics in explain ability, fairness, and general AI concludes the discussion.

Keywords: Artificial Intelligence, Mathematical Learning.



Mathematics

Study of Mathematical Modeling and Simulation using Artificial Intelligence Techniques

B. G. Urekar

Abstract: This paper explores the integration of artificial intelligence (AI) techniques with mathematical modeling and simulation to enhance the accuracy, efficiency, and applicability of mathematical models in various fields. We discuss the role of AI in mathematical modeling, including the use of machine learning algorithms, neural networks, and optimization techniques. The paper highlights the benefits of combining AI with mathematical modeling, such as improved model performance, increased efficiency, and enhanced decision-making capabilities. We also examine the challenges and limitations of this approach and provide examples of successful applications in fields like physics, engineering, and economics.

Keywords: Mathematical Modeling, Artificial Intelligence (AI), Simulation, Machine Learning, Neural Networks, Optimization Techniques, AI-enhanced Modeling.



Mathematics

Live Easy Life by using Mathematics Abhishek Madhukar Sawant

Abstract Mathematics is not just a subject but a powerful tool that simplifies our lives. From managing finances to scheduling tasks and making informed decisions, mathematical principles help streamline daily activities. This abstract explores how embracing mathematical thinking can lead to a more efficient, organized, and less stressful life.

Keywords: Mathematics Uses.





Number Theory in Everyday Life

Salver Manisha Bhumanna

Abstract: Number theory, often regarded as a pure and theoretical branch of mathematics, finds surprising relevance in everyday life. From the security of digital transactions to patterns in nature and daily routines, number theory plays a subtle but vital role. This abstract explores how fundamental concepts like prime numbers, divisibility, and modular arithmetic are used in real-world applications, bridging the gap between abstract mathematics and practical utility.

Keywords: Number Theory, Digital Transaction.



Mathematics

Fixed Point Theorem for Linear Operators in Finite-Dimensional Spaces

Janhvi Wadje

Abstract: This paper aims to establish fixed-point theorems for a class oflinear operators defined on finite-dimensional vector spaces. By applying contraction-type conditions, we demonstrate the existence and uniqueness of fixed points without requiring the operator to be continuous. The results are supported with illustrative examples and potential applications in solving systems of linear equations.

Keywords: Linear Algebra, Fixed Point, Linear Operators, Vector Spaces, Contraction Mapping



Mathematics

Developing Hybrid Models for Vehicle Routing with Task Assignment

Yogesh M. Muley

Abstract: The integration of the Assignment Problem and Vehicle Routing Problem (VRP) presents a powerful approach to optimizing logistics operations, particularly in scenarios requiring simultaneous task assignment and route planning, such as last-mile delivery and technician scheduling. Despite their importance, existing models often treat assignment and routing sequentially, leading to suboptimal solutions, especially for large-scale problems with complex constraints like vehicle capacity and time windows. This research proposes a novel hybrid model that jointly optimizes task assignment and vehicle routing, formulated as a mixed-integer linear program (MILP) and solved using a combination of exact methods, genetic algorithms (GAs), and machine learning enhancements. The model addresses scalability and real-world constraints, demonstrating significant efficiency gains in applications like e-commerce delivery and technician scheduling. By leveraging advanced computational techniques, this study fills a critical research gap in logistics optimization, offering a scalable and adaptable framework for modern supply chain management.

Keywords: Assignment Problem, Vehicle Routing Problem, Hybrid Models, Task Assignment, Logistics Optimization, Mixed-Integer Linear Programming, Genetic Algorithm, Machine Learning, Time Windows, Scalability, E-commerce Delivery, Technician Scheduling, Dynamic Optimization.



Mathematics

Review on Use of Mathematics in Artificial Intelligence

Kore S.U

Abstract: Mathematics is fundamental to artificial intelligence (AI), enabling the development of sophisticated models and algorithms. This review explores the role of mathematics in AI, highlighting key concepts, applications, and research trends. Linear algebra, probability and statistics, and calculus are essential mathematical disciplines that underpin AI models, facilitating data analysis, machine learning, and decision-making. Applications include data classification, regression analysis, and predictive modeling. Emerging trends include integrating AI in mathematics education and exploring AI's pros and cons. The intersection of AI and mathematics drives innovation, with potential applications in various fields. This review aims to provide a comprehensive understanding of mathematics' role in AI, highlighting its significance in driving advancements and innovation.

Keyword: AI, Mathematics, Model, Algorithm.



Mathematics

Study of Fractional order Mathematical models using Computational Softwares

Mr. Pathan Aamer Suhail

Abstract: This research paper presents a comprehensive study of fractional order mathematical models utilizing advanced computational software. The focus is on the development and analysis of fractional order differential equations, which offer enhanced flexibility in modeling complex dynamical systems across various fields such as physics, biology, and engineering. Through the application of computational tools, this study investigates the behavior and stability of these models, highlighting their advantages over traditional integer-order approaches. Key methodologies include numerical simulations and optimization techniques to solve fractional order equations. The findings demonstrate the effectiveness of fractional order models in capturing real-world phenomena, paving the way for further research and application in complex system dynamics.

Keywords: Fractional order mathematical models, computational software, differential equations, numerical simulations.



Mathematics

Predictive Analysis of Heat Transfer Phenomena Using Physics Informed Neural Networks: A Comprehensive Study

Dr. R. S. Varun kumar

Heat transfer analysis is critical in many engineering fields, impacting the design and optimization of systems ranging from electronic cooling to energy conversion devices. Despite their effectiveness, traditional mathematical procedures frequently struggle to handle complicated geometries and boundary conditions, which results in processing difficulties. Because of their capacity to smoothly combine domain expertise with data-driven learning, Physics-Informed Neural Networks (PINNs) have garnered a lot of attention in recent years. The use of PINNs in heat transfer analysis is examined here, which emphasizes how well they can solve differential equations governing heat transfer processes while taking physical principles into account. PINNs provide a versatile framework for simulating heat transfer processes in intricate geometries by utilizing neural networks, allowing for precise predictions at a lower computing cost. This provides insights into the theoretical foundations of PINNs and their practical implementation in heat transfer analysis, illustrating their potential to revolutionize computational heat transfer methodologies.

Keywords: Heat Transfer, Neural Networks.



Mathematics

Subclass of Analytic Functions Associated with Linear Operator

J. R. Wadkar, Namdev S Jadhav

ABSTRACT: In this work, we introduce and study a new subclass of analytic functions defined by a linear operator and obtained coefficient estimates, growth and distortion theorems, radii of star likeness, convexity and close-to-convexity are obtained. Furthermore, we obtained integral means inequalities for the class.

Keywords: Analytic, Coefficient bounds, Star like, Distortion.



Mathematics

Predictive Machine Learning Techniques For Performance Analysis of The Earth-Air Heat Exchanger

B. C. Prasannakumara

Implementing machine learning (ML) procedures on an Earth-Air heat exchanger (EAHE) allows for developing a predictive model to forecast system performance based on various inputs. The technique involves collecting data on environmental factors, operational parameters, and system outputs which include temperature changes. The data is then pre-processed to eliminate missing values and standardized to assure consistency and the choice of essential parameters involving soil type, airflow, and ambient temperature, depending on how they affect EAHE performance. The final stage is selecting appropriate machine learning approaches like neural networks to predict outcomes, including temperature reduction or energy efficiency. The model is trained using learned information and then is tested to ensure its predictability by combining diverse machinelearning methodologies. The predictive model can also enhance the design and operation of an EAHE, resulting in better thermal performance and more informed decision-making for sustainable buildings.

Keywords: Machine Learning, Heat Transfer.



Mathematics

Applications of Laplace Transform in Financial Mathematics

Rajeshwari Vishwambharrao Dhondge

Abstract: The financial mathematics field is used for precise modelling and analytical tool to deal with complex financial system and derivative pricing. Laplace transform is a powerful tool of mathematics by using this we can find the solution of differential equations that arise in various financial models. This project focuses on the application of the Laplace transform in financial mathematics in areas of option pricing, interest rate modeling, risk management and bond pricing. By using the Laplace transform this study shows how complex problems like Black-Scholes model for option pricing and the Vasicek model for interest rates can be solved with greater efficiency. This projects also finds the use of Laplace transform to solve stochastic differential equations commonly came in risk management and in the analysis of exotic derivatives. This paper presents case studies to show real world implementations of Laplace transform techniques in financial decision making and pricing models.

Also, this study takes a look at numerical methods for inverting the Laplace transform, especially in cases where analytical solutions are difficult to find and provides awareness into computational techniques that make possible the practical use of Laplace transform in financial simulations. Here, the utility of Laplace transform in financial mathematics will be clearly confirmed, presenting both a deeper understanding of their significance and practical guide for their implementations in the finance industry.

Keywords: Black-Scholes framework, Vesical model, Risk management and derivative pricing, Numerical simulations and algorithms, etc.



Mathematics

Fuzzy Goal Programming Approach to Solve Multiobjective Transportation Problem

Savan B Rathod and Madhav R. Fegade

Abstract: This paper deals with an application of fuzzy goal programming to the multi-objective transportation problem. In this paper we use special type of two new membership functions (quadratic MF and s-curve MF) to solve multi- objective transportation problem. This paper presents an application of fuzzy goal programming to the linear multi-objective transportation problem. It gives an optimal compromise solution. The obtained result has been compared with the solution obtained by above membership function. To illustrate the methodology some numerical examples are presented.

Keywords: fuzzy set, Goal Programming, Multi-Objective Transportation Problem (MOTP), Quadratic membership function,



Mathematics

Solving Multi-Objective Fuzzy Transportation Problems Using a Hybrid PSO-GA Approach

Govind S. Suryawanshi and Madhav R. Fegade

Abstract: In real-world to handle uncertainty in transportation problem, multi-objective fuzzy transportation problems (MOFTPs) is an extension of classical transportation problem. This paper develops a hybrid algorithm that combines Particle Swarm Optimization (PSO) and Genetic Algorithm (GA) technologies to optimize conflicting objectives, minimizing transportation cost, time, and risk. A fuzzy Yeager's ranking Index is used to defuzzify imprecise solutions and to evaluate the consistency among competing outcomes. Thereafter, a dynamic model FTPs applied where supply and demand vary over time. Finally, comparison is performed with MODI method and the obtained results showed that, proposed hybrid algorithm performs better in solution quality and adaptability to real-time logistics.

Keywords: Multi-objective optimization, fuzzy logic, dynamic transportation, PSO-GA.



Mathematics

Prediction of Some Commodities Using Statistical Data Mining Techniques

Ms. Payal Avinash Mahajan, Dr. Madhav R. Fegade

Abstract: This study focuses on the predictive modeling of key Indian commodities using statistical and data mining techniques. Historical price data and relevant economic indicators are analysed through methods such as time series forecasting, regression analysis, decision trees, and neural networks. The research aims to identify significant patterns and enhance the accuracy of forecasts across various commodities. The results provide valuable insights for policymakers, investors, and supply chain participants in strategic decision-making and planning.

Keywords: Indian commodities, economic indicators, time series forecasting, regression analysis, neural networks, decision trees, predictive analytics.



Mathematics

Statistical Evaluation of Machine Learning Optimization Algorithms: A Case Study Using Retail Sales Forecasting Data

Pooja Shitole^{*}, Vikas Jadhav, Tukaram Navghare

Abstract: Accurate retail sales forecasting is pivotal for effective inventory management and strategic planning. This study conducts a statistical evaluation of various machine learning optimization algorithms, including Random Forest (RF), Gradient Boosting (GB), Support Vector Regression (SVR), and XGBoost, applied to retail sales data characterized by high seasonality and diverse product categories. Utilizing hyperparameter tuning techniques such as randomized search cross-validation, the models' performances were assessed using metrics like R-squared, Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), and Root Mean Squared Logarithmic Error (RMSLE). The optimized RF model demonstrated superior predictive capabilities, achieving an R-squared value of 0.945 and reducing RMSLE to 1.172, outperforming other models in capturing complex sales patterns. These findings underscore the effectiveness of advanced machine learning optimization techniques in enhancing retail sales forecasting accuracy, offering valuable insights for data-driven decision-making in the retail sector.

Keywords: Machine Learning, Statistical data.



Mathematics

Comparative Study of CNN-Based Face Detection Models on Benchmark Datasets

Tukaram Navghare

Face detection is a critical component in numerous applications, including security, authentication, and human-computer interaction. This study presents a comparative analysis of several Convolutional Neural Network (CNN)-based face detection models, specifically VGG16, ResNet50, and MobileNetV2. Each model was trained and evaluated on the FDDB dataset, which comprises 11,900 images featuring faces with varying sizes, orientations, and conditions. To enhance model robustness, data augmentation techniques such as color alteration, blurring, and flipping were applied. The models were adapted to perform binary classification and facial bounding box regression, trained over 40 epochs with a batch size of 64, utilizing binary cross-entropy and Distance-IoU (DIoU) loss functions. Evaluation metrics included accuracy and Intersection over Union (IoU) scores. The results indicated that VGG16 achieved the highest accuracy of 92.40%, outperforming ResNet50 and MobileNetV2, which attained accuracies of 85.68% and 60.28%, respectively. These findings suggest that VGG16 is more suitable for applications requiring high-precision face detection, while MobileNetV2 may be preferred in scenarios where computational efficiency is paramount. The study provides insights into selecting appropriate CNN architectures based on specific application requirements.

Keywords: CNN, Face Detection.



Mathematics

Identification of optimal Genetic algorithm patterns to the job shop schedule

Mr.Sumedh U. Buktare, Dr. Vikas S. Jadhav,

Abstract: In this paper, Data Mining (DM) algorithms for the extraction of knowledge from a large set of job shopschedules are studied. Toe purpose of this study is to apply data mining methodologies to explore the patterns in data generated by a Genetic Algorithms (GA) performing Scheduling operations and to develop a rule set scheduler which approximates theGA's scheduler. Inusing a genetic algorithm for job shopscheduling, the solution is an operational sequence for resource allocation. Among these optimal or near optimal solutions, similar relationships may exist between the characteristics of operations and sequential order. An attribute-oriented induction methodology was used to explore the relationship between an operations' sequence and its attributes and a set of rules has beendeveloped. These rules can duplicate the genetic algorithms performance on an identical problem and provide solutions that are generally superior to a simple dispatching rule for similar problems.

Keywords: Job Shop scheduling, Data mining, Optimization, Genetic algorithm, Dispatching rule.



Mathematics

Artificial Intelligence; A computational and Linear Programming Approach

Digambar Namdeorao Shinde

Abstract: In many different domains, artificial intelligence (AI) has emerged as a powerful tool for tackling complex problems. This study looks on the potential applications of computational and linear programming techniques in particular to real-world issues. The mathematical aspect of Developing models and algorithms that mimic human thought and decision-making is a component of artificial intelligence. "Linear programming" is a subfield of mathematical optimisation that considers several linear constraints while attempting to maximise or minimise a linear objective function. By combining these tactics, we may improve decision-making, optimise efficiency, and more effectively distribute resources across a range of sectors, including as manufacturing, finance, logistics, and healthcare. This research looks at the theoretical foundations of computational and linear programming methodologies as well as case examples that demonstrate their effective use in real-world situations. The outcomes demonstrate the efficacy of AI-powered computational and linear programming techniques to solve challenging issues, which eventually produce better results and higher output. Future research and innovation in these fields have enormous potential to address ever more complex problems as AI develops.

Keywords: Artificial Intelligence, Linear Programming.



Mathematics

Application of Multi - Attribute Decision Making Problem Using Fuzzy TOPSIS Based on Shannon Entropy

Dr. Vikas S. Jadhav

Abstract: In today's competitive market, for a business firm to win higher profit among its rivals, it is of necessity to evaluate, and rank its potential customer segments to improve its Customer Relationship Management (CRM). This brings the importance of having more efficient decision-making methods considering the current fast growing information era. These decisions usually involve several criteria, and it is often necessary to compromise among possibly conflicting factors. In this paper a new extension of fuzzy Techniques for Order Preferences by Similarity to Ideal Solution (TOPSIS) based on Shannon entropy concept for customer segment selection is proposed. Fuzzy set theories are also employed due to the presence of vagueness and imprecision of information.

The contribution of this paper is that it provides a framework for MCDM which considers vagueness and ambiguity as well as allowing to set multiple aspiration levels for customer segment selection problems in which "the more/higher is better" (e.g., benefit criteria) or "the less/lower is better" (e.g., cost criteria). At the end, a numerical example of this approach is shown to illustrate its effectiveness.

Keywords: Fuzzy set theories, CRM, Customer Segment selection, MCDM, TOPSIS, Shannon entropy etc.



Chemistry

Newly Synthesized Terpolymer From Pthalic Acid, Ethylene-Diamine And Furfuraldehyde

Manisha M. Jiwatode, Afrin Sheikh

Abstract: Terpolymer was prepared by the phthalic acid (PA), Ethylene Diamine (ED), Furfuraldehyde(F) with 2M HCl as a catalyst for polymerization with molar ratio (1:1:2). The sequence structure of terpolymer chain characterized by FTIR, ¹HNMR spectroscopy. The empirical formula and empirical formula weight of the resin were determined by elemental analysis. Thermogravimetric analysis was used for the investigation of thermal stability of the terpolymer. Additionally Freeman Carroll and Sharp Wentworth method was utilized for the calculation of activation energy. Order of reaction and free energy also calculated from Freeman Carroll Method.

Keywords: Synthesis, Characterization, thermal stability and activation energy of synthesized terpolymer.



Chemistry

Synthesis, Characterization And Antibacterial Evaluation Of New 2-Methoxynicotinonitrile Analogues

S. N. Lakhekar G. B. Rahatikar B. D. Kalyankar, Seema Habib, A.V. Chakinarpuwar U.K. Warghane, T. E. Khatke, M. A. Baseer

Abstract: The new series of 2-methoxynicotinonitrile derivatives (solid) were prepared from mixture of Chalcones (solid) (0.001 mol) **(1a-i)**, malononitrile (liquid) (0.078 ml) (0.001 mol) and 0.040 mg (0.001 mol) of sodium hydroxide in methanol (15ml) as a solvent by reflux technique for 7-8 hours at 80°C. all the newly synthesized compounds were evaluated for their antibacterial action in vitro against gram +ve bacteria S. aureus, B. subtilis and gram -ve bacteria P. aeruginosa, E. coli by agar well diffusion method. The tested compounds **(2a)** presented excellent and good antibacterial activity against P. aeruginosa and E. coli respectively. **(2b)** presented excellent and good antibacterial activity against S. aureus. **(2e)** showed good antibacterial activity against B. subtilis w.r.t penicillin as a std. drug. The chemical structures of the compounds were proved by IR, 1H NMR, Mass, C¹³ NMR spectrometric data.

Keywords: 2-methoxynicotinonitrile, chalcone, malononitrile, antibacterial activity, agar well diffusion method, spectroscopic data.



Chemistry

Kinetic and Mechanistic Insights into Alcohol Oxidation by Chromate with a Polymer-Supported Reagent

Dr. Chandrakant V.Magar

ABSTRACT: Oxidation of organic compounds is extremely important from synthetic and technological view points. Many of the industrially imperative organic compounds like aldehydes, ketones, acids, etc. can be produced by the oxidation of allied substrate by the employ of suitable oxidizing agents. The kinetics of the oxidation of 1-Phenylethanol (PE) by PS-Chromate has been followed by monitoring the increase in the absorbance of reaction intermediate. The reaction followed by *zero order* behavior, being *zero order* in each reactant. The rate of reaction increase with increase in weight of oxidant, concentration, temperature and dielectric constant of the solvent. A free radical scavenger affects the reaction rate. The stiochiometry has been found to be 1mol PE: 1mol of Chromate. Thermodynamic parameters evaluated are [Ea] = 79KJ mol⁻¹, $[\Delta H^{#}]=58 \text{ KJ mol}^{-1}$, $[\Delta S^{#}]=-72 \text{ JK mol}^{-1}$, $[\Delta G^{#}]=298\text{KJ mol}^{-1}$, and $[A]=3.5 \times 10^{-5}\text{s}^{-1}$ results under pseudo *zero order* conditions are in agreement with the rate law. Main reaction product acetophenone isolated and characterized.

Keywords- Polymer supported Reagent, oxidation, kinetics and mechanism,



Chemistry

Application of Biochar as a Sustainable Adsorbent for Greywater Purification

Mr. Umesh K. Warghane

Abstract: The increasing scarcity of freshwater resources has intensified the need for effective greywater treatment solution. This study investigates the application of biochar as a low-cost, sustainable adsorbent to reduce turbidity and total dissolved solid (TDS) in greywater. Biochar produced through the pyrolysis of organic biomass possesses a highly porous structure and functional surface groups that enhance its capacity to adsorb pollutant. Greywater sample treated with varying dosage of biochar were analysed for turbidity and TDS removal efficiency. Result demonstrated a significant reduction in both parameters, with optimal removal achieved under specific contact times and biochar concentration. The finding suggest that biochar can serve as an efficient and eco-friendly material for greywater treatment, contributing to water reuse and environmental conservation efforts.

Keyword: Biochar, Greywater treatment, Water purification, Turbidity reduction



Chemistry

Click Chemistry for the Synthesis and Antibacterial Properties of Chalcone-anchored Aryl Acetamide 1,2,3-triazoles

Jaidip B. Wable, Hrishikesh S. labhade, Pradnya J. Prabhu

Abstract: 1,2,3-triazoles are a favored structural motif among nitrogen-containing heterocyclic compounds that have garnered significant interest from both industry and research. The fields of drug discovery, materials science, organic synthesis, supramolecular chemistry, polymer chemistry, and bioconjugation all make extensive use of 1,2,3-triazoles because they are not found in nature. Thus, it is essential to provide a basic and easy-to-use method for the synthesis of 1,2,3-triazoles. In this study, we report the synthesis of new molecular hybrids of (E)-2-(4-((2-(-3(5-chloro-2-hydroxyphenyl)-3-oxoprop-1-en-1-yl)-4-fluorophenoxy) methyl)-1H-1, 2, 3-triazol-1-yl)-N-phenylacetamide and derivatives by Claisen-Schmidt condensation and Click chemistry in good to excellent yields. The structures of the synthesized compounds were confirmed by ¹H, ¹³C and High-Resolution Mass Spectrometry techniques. The antibacterial activity of each produced molecule was assessed against the strains of E. Coli, P. aeruginosa, S. aureus, and S. pyogenus. Compounds 6a, 6c and 6m showed excellent antibacterial activity against the bacterial strain E. coli while compound 6o showed excellent antibacterial activity against the bacterial strain S. aureus.

Keywords: Hybrids, chalcone, 1,2,3-triazole, Click chemistry, antibacterial



Chemistry

Synthesis, Characterization and Antimicrobial Activities of some novel flavone Derivatives

Kendre Madhav Marotirao

Abstract: -Chalcone derivatives are considered as key starting materials for the synthesis of different classes of heterocyclic compounds such as flavones, flavanones isoflavone, pyrazolines, oxazoles, isoxazoles, benzodiazepine benzothiazepine etc. Among the heterocyclic compounds, substituted flavone derivatives are valuable hetero-aromatic compounds because of their wide spectrum of pharmacological applications such as antimalarial, anticancer, antimicrobial, anti-inflammatory activities. Flavones are important member of oxygen containing heterocyclic compounds. The substituted flavone derivatives exhibited extensive chemical and pharmacological properties. The present work synthesis of a series of substituted flavone derivatives have been synthesized by the treatment of 1-(substituted-phenyl)-3-(4'-dimethylamino-phenyl)-prop-2-en-1-one, with iodine in dimethylsulfoxide were cyclized to flavones. The newly synthesized flavone derivatives have been characterized by IR, ¹HNMR and Mass spectral analysis and evaluated for their antimicrobial activity.

Keywords: chalcones, Substituted flavones, Antimicrobial activity.





Chemistry

Synthesis of New Substituted Pyrazoles Hetrocycle

Suwanand Deshmukh

Abstract: A mixture of phenyl hydrazine (Ph-NH-NH₂) and [bis (methyl sulfanyl) methylidene] propanedinitrile heating at 65-70°c temperature with drop wise addition of, NN-dimethylformamide in present of base we obtain the heterocyclic product like 3-amino,5-(methylthio), 1-phenyl,1H-pyrazole-4-carbonitril. We can make a different derivative of this compound by substituting the position of methylthio group. The two derivatives like 3-amino,5-[(4-nitro phenyl) amino]-1-phenyl -1H pyrazole-4-carbonitrile and 3-amino,5-[(4-Chlorophenyl) amino]-1-phenyl-1H_pyrazole-4-carbonitrile Derivatives. Both the derivative does not show any microbial activity. The structure of the obtained product was fully characterized using different spectral techniques including IR, NMR, and MS spectroscopy.

Keyword: Phenyl hydrazine, Pyrazole, Methylthio, Nitro phenyl, Chloro phenyl, Carbonitril.



Chemistry

6,8-Dimethyl-4-(Methylthio)-4-Oxo-4h-Pyrimido[1,2-A] Pyrimidine-3-Carbonitrile

Sirsat Shivraj B, Jadhav Anilkumar GChavhan Nilesh B., Shinde Sainath L.,

Abstract: In present report novel pyrimidine were prepared from starting materials ethyl 2-cyano-3,3-bis(methylthio) acrylate and guanidine nitrate with potassium carbonate in DMF at reflux condition. The resulting compound 2-amino-1,6-dihydro-4-(methylthio)-6-oxopyrimidine-5carbonitrile (1) was further reacted with acetyl acetone in acidic condition cyclise to 6,8-dimethyl-4-(methylthio)-4-oxo-4H-pyrimido[1,2-a]pyrimidine-3-carbonitrile as a parent compound (2) with good yields. The synthesized compounds were characterized by spectral methods. The compound (2) possesses replaceable methylthio (-SCH₃) group at 4 position. The compound (2) react with various nucleophiles like substituted aromatic amines, aromatic phenols, hetryl amines and active methylene compounds to give 6,8-dimethyl-4-(methylthio)-4-oxo-4Hpyrimido[1,2-a]pyrimidine-3-carbonitrile in good yields.

Keywords Claisen Schmidt Condensation, α , β - unsaturated (Michael acceptor).



Chemistry

Application of Biochar as a Sustainable Adsorbent for Greywater Purification

Mr. Umesh K. Warghane

Abstract: The increasing scarcity of freshwater resources has intensified the need for effective greywater treatment solution. This study investigates the application of biochar as a low-cost, sustainable adsorbent to reduce turbidity and total dissolved solid (TDS) in greywater. Biochar produced through the pyrolysis of organic biomass possesses a highly porous structure and functional surface groups that enhance its capacity to adsorb pollutant. Greywater sample treated with varying dosage of biochar were analysed for turbidity and TDS removal efficiency. Result demonstrated a significant reduction in both parameters, with optimal removal achieved under specific contact times and biochar concentration. The finding suggest that biochar can serve as an efficient and eco-friendly material for greywater treatment, contributing to water reuse and environmental conservation efforts.

Keyword: Biochar, Greywater treatment, Water purification, Turbidity reduction



Chemistry

Synthesis And Characterization Of Fluorinated Chalcones and Its Derivatives From Trifluoromethylacetophenone

Mr.R.N Gaikwad

Abstract: In this study, a series of fluorinated chalcone derivatives were synthesized utilizing trifluoromethylacetophenone as the key starting material through the Claisen-Schmidt condensation reaction. The synthetic approach involved the reaction of trifluoromethylacetophenone with various substituted aromatic aldehydes under basic conditions, enabling the formation of structurally diverse chalcones. The incorporation of trifluoromethyl groups into the chalcone scaffold was found to enhance the compounds' chemical stability, lipophilicity, and potential biological activity. Structural elucidation and purity assessment of the synthesized compounds were carried out using Fourier Transform Infrared Spectroscopy (FTIR), Proton and Carbon Nuclear Magnetic Resonance (¹H and ¹³C NMR), Mass Spectrometry (MS), and melting point determination. The study further investigates the impact of different aldehydic substituents on reaction efficiency, yield, and physicochemical properties of the final products.

Keywords: Trifluoromethylacetophenone, Claisen–Schmidt condensation, Fluorinated chalcones, Substituted aldehydes, Spectroscopic characterization.



Chemistry

Efficient La-Doped ZnO@Ag Core-Shell Catalyst for Green Synthesis of Tetrahydro benzopyran Derivatives.

Mr. Hrishikesh S. Labhade^a*, Mr. Jaidip B. Wable^a.

Abstract: The growing focus on sustainable synthesis methods addresses environmental concerns. This work highlights the catalytic application of lanthanum-doped, silver-coated ZnO core-shell nanoparticles for the one-pot, solvent-free synthesis of tetrahydrobenzopyran derivatives from dimedone, aldehydes, and malononitrile under grinding conditions at room temperature. The unique combination of lanthanide doping and silver coating enhances surface properties, resulting in higher catalytic activity and reusability.

The catalyst was synthesized via precipitation and characterized using techniques like FTIR, XRD, ADS-DES, BJH, BET, SEM, EDAX, XPS HRTEM, and SAED, while the THP derivatives were analyzed using FTIR, ¹³CNMR, ¹HNMR, and MS.

Catalyst key features include high catalytic efficiency, excellent yields, short reaction times, simplicity, reusability, cost-effectiveness, and eco-friendliness. This method eliminates the need for solvents and column purification, making it a green and efficient approach for synthesizing medicinally important tetrahydropyran derivatives.

Keywords: Lanthanum doped, ZnO Nanocatalyst, Tetrahydropyran, Green Synthesis, Solvent-free, Reusable.



Chemistry

Microwave Assisted Synthesis, Characterization and Antioxidant Activities of New Thiopyrimidine Derivatives From Chalcones.

G.B. Rahatikar

Abstract: Pyrimidine are an important class of natural product, they are found to be much in use for their therapeutic properties. They are also used as precursors for the synthesis of different substituted heterocyclic derivatives. A new microwave method (MM) has been developed for the synthesis of a series of Thiopyrimidine derivatives using halogen substituted 2'-hydroxy chalcones and comparing it with conventional method (CM). The synthesized compounds were characterized by various spectroscopic techniques viz IR, HR-MS, and 1H NMR. The time required for completion of reaction in MM varied from 1 to 4min as compared to CM which required 10–12 hour. The microwave method is clean with shorter reaction time, mild reaction condition, eco-friendly, excellent yield as compared to conventional methods and reduces the use of volatile organic compounds (VOCs). These compounds were screened for their antibacterial activities against four pathogenic organisms: Bacillus Subtilis, Staphyloccus aureus, E. coli and Salmonella typhi. Some of them were found to possess significant activity, when compared to standard drugs.

Keywords: Thiopyrimidines, hydroxyl Chalcones, Microwave Irradiation, Antimicrobial Activity



Chemistry

Application of Artificial Intelligence in Forest Research and Management: A Review

Tarun A. Shinde

ABSTRACT: Artificial Intelligence is deals with automatic presentation, collection and use of information that attempt to to utilise human thought. The development of AI application involve the advanced technology in computer science. The role of artificial intelligence in the field of forest facilitate the efficient surveillance, administration and preservation of forest. The conservation strategies also constitute the the restriction from pandemic situations in forest. Now a days forest fire is also create challenge for the conservation of biodiversity and forest strata. Likewise such kind of similar situations are to be controlled by the usage of artificial intelligence. The objective of this paper is to present a comprehensive review of how AI are to be utilised in forestry sector and the conservation of biodiversity worldwide. The application of AI technology enhances the availability of extensive data pertaining to forest and biodiversity in the utilisation of cloud computing, digital and satellite technology the facilitate the wider acceptance and implementation of AI technology.

Keywords: Artificial Intelligence, AI, Surveillance, Forestry, Wildlife, Forest Fire, Biodiversity Conservation,



Chemistry

Study of Chemistry of Substituted Fused Benzimidazole and Their Biological Importance

Prashant N. Ubale

Abstract:_Nitrogen containing polycyclic heterocyclic compounds specially fused heterocycles are the basic units of natural and synthetic biological important substances. One of these important fused heterocyclic compound is Pyrimido Benzimidazole, Pyrazolo-Benzimidazole, Pyrido-Benzimidazole, Quinoline etc. These fused heterocycles are polycyclic fused heterocyclic compounds containing Nitrogen as a heteroatom. The application of these fused benzimidazole widely used in medicinal chemistry. Different substituted benzimidazole shows remarkable activity in medicinal chemistry. In this article we study the different synthetic approach of substituted pyrimido benzimidazole and their biological activity.

Keywords: Fused heterocycles, Pyrimidine, Benzimidazole, biological importance.



Chemistry

Synthesis of Tridentated Co(II), Zn(II) Metal Complexes derived from 5- Bromo-2-Hydroxy Benzaldehyde and their Anticancer Activity.

Sandipkumar Devraye

Abstract: A series of Schiff base metal complexes containing Co(II), Zn(II) ions were prepared and characterized by spectral analyses such as UV, IR, 1H NMR, 13C NMR, TGA-DTA, XRD and ESR. From spectral data it is confirmed that Schiff base ligands coordinated through tridentate with metal ions via O, N, N- atoms and adopt octahedral structure. From XRD patterns it is obtained metal complexes C1-C4 have empirical formula apparent that M+2(isonicotinohydrazide)2] with 1:2 metal-ligand proportion. TGA-DTA study indicate that almost all complexes are stable at room temperature and showed loss of weight at relatively high temperature. Further the anticancer activity were investigated. In-vitro anticancer properties against human cancer cell line MCF-7 revealed that the metal complexes display IC50 values 7.20, and 2.70 µg/mL respectively compared to standard 5 flurouracil (13.38 µg/mL), which implies the metal-complexes exhibits potent anticancer activity. From these study, we have made our perception that Co(II) ion coordinated to ligand showed potency in inhibiting the growth of cancer cells.

Keywords: Schiff bases, isonicotinohydrazide, metal-complexes, cytotoxic, anticancer activity.



Chemistry

Synthesis of 2- Hydroxynapthyl Pyrazolines Containing Isoniazid Component: A Potential Antitubercular Agent

Mohini Wanner, Gajanan Kottapalle

Abstract:- The new series of pyrazolines derivatives containing Isoniazied componant were synthesized from 2- hydroxynapthyl Functionalised chalcones and isoniazid using sodium hydroxide as a base in 2- ethoxy ethanol. We evaluated their antitubercular activity against the *Mycobacterium tuberculosis* strain ($H_{37}R_v$) by Microplate Alamar Blue Assay (MABA). Some of the tested compounds **3a**, **3b**, and **3c** were found to have higher antitubercular activity than Streptomycin and same as that of Pyrazinamide and Ciprofloxacin, while remaining compound showed moderate activity. Whereas it is found that the disubtituted halogen compound and electron- withdrawing group on the phenyl ring are important substitutions for an increase in antitubercular activity.

Keywords:- Chalcones, Pyrazolines, Isoniazied, 2- hydroxynapthyl pyrazolines, Antitubercular Activity.



Chemistry

Synthesis Of 1-(2-Substitutedphenyl-2,3-Dihydro-1H-Benzo[B] [1,4] Diazepin-4-Yl) Naphthalene-2-Ol Under Different Solvent Conditions as A Potent Antimicrobial Agent

Mrudula Toplewar, Gajanan Kottapalle

1-(2-substitutedphenyl-2,3-dihydro-1H-**Abstract:** In the present investigation. benzo[b][1,4]diazepine- 4-yl)naphthalene-2-ol (3a-3 h) were synthesized in optimization of solvents by reac- tion of 1-2(2-hydroxynaphthalen-1-yl)-3-substitutedphenylprop-2- en-1-one (1a-1 h) and benzene-1,2-diamine in catalytic amount of piperidine using 2- ethoxy ethanol as a solvent. The synthesized compounds were screened for their *in vitro* antimicrobial activity and we found that the compounds (3d and 3e) having electron withdrawing group and the com- pounds (3b, 3 g and 3 h) having electron releasing group at 4-position on phenyl ring showed good antibacterial and antifungal activity respectively. The compound 3 g shows same activity as that of standard drug fluconazole against Angier. Hence, it is found that the electron withdrawing and electron releasing group at para position on phenyl ring and 1:2 molar ratio of chalcones and benzene-1,2-diamine in 2-ethoxy ethanol as a solvent are the key factors to increase antimicrobial activity and yield of the synthesized compounds respectively.

Keywords: 1,5-benzodiazepine Benzene-1,2-diamine 2-ethoxy ethanol Solvent optimization antimicrobial activity.