

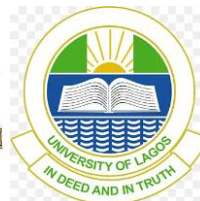
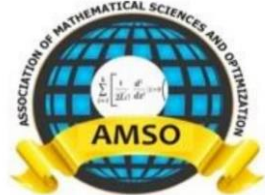
**International Conference  
on  
Mathematical Sciences and Optimization**

Theme: Applying Mathematical Research for the 4th Industrial Revolution  
26th – 30th August 2024

**BOOK OF ABSTRACTS**

**POWERED BY**

Association of Mathematical Sciences and Optimization  
(AMSO)



## A. AMSO NATIONAL EXECUTIVES

### **Professor J. O. Olaleru**

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University of Lagos, Akoka.  
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### **Dr. A. Abolarinwa**

Secretary, AMSO  
University of Lagos, Akoka.

### **Dr. H. Akewe**

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University of Lagos, Akoka  
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### **Dr. G. M. Sobamowo**

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### **Dr. G. A. Okeke**

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### **Dr. Joy Umudu**

Representative, North-East  
University of Jos

## B. SCIENTIFIC COMMITTEE

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Prof. S. A. Okunuga

Department of Mathematics  
University of Lagos

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Dr. G. A. Okeke  
Mr. A. P. Ebomese

**D. LOCAL ORGANIZING COMMITTEE**

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Dr. T. O. Abiodun

Dr. L. M. Erinle.-Ibrahim  
Dr. O. K. Adewale  
Dr. O. W. Lawal

# ICMSO 2024 Pre-Conference Workshop

## 26th – 28th, August 2024

The 3-day pre-conference workshop is meant to expose young researchers and mature researchers, who are interested in multi-disciplinary research in Mathematical Sciences and Optimization Theory. The workshop which would be handled by experts, both local and international, and will give the necessary rudiments for good life-time research in Mathematical Sciences with ultimate applications in Optimization theory, methods, and applications.

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### Opening ceremony 8:30 am – 9:00 am

1. Arrival of Dignitaries	8:30 AM
2. Opening Prayer	2 minutes
3. Welcome address by Prof. J. O. Olaleru, President, AMSO	5 minutes
4. Introduction of Guest Speakers by Dr. A. Abolarinwa	10 minutes

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### Workshop 1: Pure Mathematics

Generalities and Functional Background for Inverse Problems

Groups, their Generalisations and some Applications

Perspectives in Fixed Point Theory

Current Trend in Hyper-Algebraic Structures and their Applications

**Speakers: Prof. G. Degla, Prof. T. G. Jaiyeola, Prof. M. Abbas**

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### Workshop 2: Applied Mathematics

Fractional Differential and Integral Operators with Applications

Introduction to Machine Learning and AI with Applications – Control Theory and Applications

Mathematical Modelling

**Speakers: Prof. A. Atangana, Prof. B. I. Oyelami, Dr. C. Nwaigwe, Dr. E. A. Bakare**

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### Workshop 3: Statistics and Applications

Data Analytics Tools

Bayesian Modeling

Survival Analysis to Statistics

**Speakers: Prof. S. Adebayo, Prof. W. B. Yahya, Dr. O. T. Arowolo**

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### Hands on Training (All 3 groups)

**Python:**

**Latex for beginners:**

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## TIMETABLE

		9.00-10.30am	10.45-12.15am	12.15-12.45	12.45-2.15pm	2.30-3:30pm	3.30-4.30pm	4:30-6:00pm
MONDAY	Pure	Prof. T. G. Jaiyeola	Prof. G. Degla	BREAK	Prof. M. Abbass	FREE	BREAK	HANDS ON
	Applied	Prof. B. Oyelami	Prof. A. Atangana		Dr. E. A. Bakare	Dr. C. Nwaigwe		
	Statistics & Applications	Prof. W. B. Yahaya	Prof. W. B. Yahaya		Prof. W. B. Yahaya	Prof. W. B. Yahaya		
TUESDAY	Pure	Prof. T. G. Jaiyeola	Prof. G. Degla	BREAK	Prof. M. Abbass	FREE	BREAK	HANDS ON
	Applied	Prof. B. Oyelami	Prof. A. Atangana		Dr. E. A. Bakare	Dr. C. Nwaigwe		
	Statistics & Applications	Prof. S. Adebayo	Prof. S. Adebayo		Prof. S. Adebayo	Prof. S. Adebayo		
WEDNESDAY	Pure	Prof. T. G. Jaiyeola	Prof. G. Degla	BREAK	Prof. M. Abbass	FREE	BREAK	HANDS ON
	Applied	Prof. B. Oyelami	Prof. A. Atangana		Dr. E. A. Bakare	Dr. C. Nwaigwe		
	Statistics & Applications	Dr. O. T. Arowolo	Dr. O. T. Arowolo		Dr. O. T. Arowolo	Dr. O. T. Arowolo		
THURDAY		Opening Ceremony	Plenary Session [Prof. C. Thron]		Paper presentation	Paper presentation	Paper presentation [ONLINE]	Paper presentation
FRIDAY		Plenary Session [Prof. T. G. Jaiyeola]	Paper presentation	Paper presentation [ONLINE]	BREAK	ANNUAL MEETING	DEPARTURE	

## ICMSO 2024 PROGRAMME SCHEDULE

**Thursday 29th August – Friday 30th August 2024**

### CONFERENCE OPENING CEREMONY

**9:00 AM – 10:30 AM**

- |   |            |
|---|------------|
| 1. Arrival of Dignitaries   | 9:00 AM    |
| 2. Opening Prayer   | 2 minutes  |
| 3. National Anthem  | 3 minutes  |
| 4. Introduction of Dignitaries  | 5 minutes  |
| 5. Welcome address by the <b>Prof. J. O. Olaleru</b> , President, AMSO  | 10 minutes |
| 6. Message by <b>Prof. Oluwole Sikiru Banjo</b> , Vice Chancellor,<br>Tai Solarin University of Education                     | 10 minutes |
| 7. Message by <b>Prof. P. Mebine</b> , Executive Director/CEO,<br>National Mathematical Center                                | 10 minutes |
| 8. Keynote Address by <b>Prof. A. Atangana</b> , University of Free State, SA<br>(No. 1 Mathematician, World Stanford Rating) | 30 minutes |
| 9. Message from the President, Nigerian Mathematical Society  | 5 minutes  |
| 10. Goodwill Messages from <b>Prof. A. A. Arigbabu</b> (Hon. Comm.)   | 5 minutes  |
| 11. Message from <b>Prof. O. D. Adejoye</b> , Dean, College of Science and<br>Information Technology                          | 5 minutes  |
| 12. Message by the HOD, Mathematics, Tai Solarin Education of Education   | 5 minutes  |
| 13. Vote of Thanks by <b>Dr. H. Akewe</b> , Chairman, NOC   | 5 minutes  |
| 14. Closing Prayer  | 2 minutes  |

### PAPER PRESENTATION SCHEDULE

#### **Thursday 29th August 2024**

- |                     |   |
|---------------------|---|
| 10:45 AM – 12:15 PM | Plenary Session by <b>Prof. C. P. Thron</b> |
| 12:15 AM – 12:45 PM | Break                                       |
| 12:45 PM – 3:30 PM  | Session I                                   |
| 3:30 PM – 4:30 PM   | Lunch Break                                 |
| 4:30 PM – 6:00 PM   | Session II                                  |

#### **Friday 30th August 2024**

- |                     |  |
|---------------------|--|
| 9:00 AM – 10:30 AM  | Plenary Session by <b>Prof. T. G. Jaiyeola</b> |
| 10:45 AM – 12:45 PM | Session III                                    |
| 12:45 PM – 2:15 PM  | Lunch Break/Jummat Prayers                     |
| 2:30 PM – 3:30 PM   | Annual Meeting                                 |
| 3:30 PM – 6:00 PM   | Depature                                       |

## PLENARY TALKS

**PT 01: Imputation of Missing Climatological Parameter Data Through Local Covariance Estimation** by C. Thron, K. Robinson & J. Guidihoumne

**PT 02: On Semi-Symmetric  $(\alpha, \beta, \gamma)$ -Inverse Quasigroup** by R. Ilemobade & T. G. Jaíyéolá

## PARALLEL SESSIONS

### PURE MATHEMATICS

**PM 01: Soft Sets Application in Medical Diagnosis** by A. O. Yusuf & H. M. Balami

**PM 02: Generalized Time Scale Hardy and Opial Inequalities via  $(p, q)$ -Calculus** by Y. O. Anthonio, M. T. Mohammed, R. A. Wahab & K. Rauf<sup>2</sup>

**PM 03: The Normal Structure in Banach Spaces and Fixed Point Theorems in Cone Metric Spaces over Banach Algebra** by G. A. Okeke & A. B. Panle

**PM 04: Common Fixed Point Results for four Mappings On  $C^*$ -Algebra-Valued Bipolar Metric Spaces** by A. Ige, J. Olaleru & H. Olaoluwa

**PM 05: The Subgroup Structure of Solvable Groups for Minimal and Maximal Normal Subgroups** by A. A. Malle

**PM 06: Some Fixed Point Results for Contraction Mappings in Convex G-Partial Metric Spaces with Applications** by K. S. Eke & J. O. Olaleru

**PM 07: Algebraic Study Of The Variant Of Trioids** by M. J. Ibrahim, D. A. Oluyori, T. Mustapha

**PM 08: Convolution Operators on the Euclidean Motion Group** by U.N. Bassey & U.E. Edeke

**PM 09: Higher Order Opial-Type Inequalities on Time Scales** by E. E. Aribike, S. A. Aniki & R. Kamilu

**PM 10: Lie Point Symmetries of Biharmonic Equation on a Flat Surface of Revolution** by A. M. Nass, K. Mpungu & R. I. Nuruddeen

**PM 11: Characterising Smoothness of Type A Schubert Varieties through Palindromic Poincaré Polynomial Method** by A. P. Adetunji, H. P. Adeyemo, D. O. A. Ajayi & S. A. Ilori

**PM 12: Parabolic Frequency Functional for the Conformal Ricci Flow** by A. Abolarinwa & S. Azami

**PM 13: Analysis of Weak Associativity in some Hyper-Algebraic Structures that represent Redox Reactions** by K. G. Ilori, & T. G. Jaiyéolá

**PM 14: Fixed Point Theorems for some Iteration Processes with Generalized Zamfirescu Mappings in Uniformly Convex Banach Spaces** by S. A. Raji

**PM 15: Some Fixed Point Results for Kannan Contraction Mapping in Convex Gb–Metric Spaces with Application to Integral Equations** by F. E. Igbogi, & K. S. Eke

**PM 16: Convergence Results for Sequential Henstock Stieltjes Integral in Real Valued Space** by V. O. Iluebe & A. A. Mogbademu

**PM 17: A Convex S-Metric Space and its Topological Structures** by O. K. Adewale, S. O. Ayodele, B. E. Oyelade, O. V. Akintunde, E. E. Aribike, S. A. Raji & G. A. Adewale

**PM 18: Approximation of the Fixed Point of Multivalued Mapping in Banach Spaces with Applications** by G. A. Okeke & C. I. Ugwuogor

**PM 19: An Hybrid Conjugate Gradient Method for Nonlinear Optimization Problems with Global Convergence Properties** by I. A. Osinuga & M. O. Olubiyi

**PM 20: Short Convergence Greatest Common Divisor Algorithms: A New Approach** by J. A. Erho & A. B. Okrinya

**PM 21: Generalized Coupled Fixed Point on Cone Metric Space** by A. U. Abdulazeez, R. A. Aderinoye-Rabiu, K. F. Adedapo & O. G. Olupitan

**PM 22: Two-Step Inertial Tseng’s Extragradient Method for Solving Quasimonotone Variational Inequalities** by R. N. Nwokoye, O. T. Mewomo & C. C. Okeke

**PM 23: Analysis and Calculus in the eyes of Binary Operations: An Intuitive Approach** by H. O. Olaoluwa

## **NUMERICAL ANALYSIS & APPLIED MATHEMATICS**

**AM 01: Controlling the Dynamics of Diabetes Melitus with Mathematical Model** by K. A. Adeyemo

**AM 02: Local Stability of Modeling the Effect of Vaccination and Novel Quarantine-Adjusted Incident on the Spread of Newcastle Disease Virus** by N. O. Lasisi, A. A. Ibrahim, H. M. Jibrin, F. Suleiman

**AM 03: Magnetic Frustration arising from Competiting Interaction in Spin 1/2 Ladder** by M. Amos

**AM 04: Optimizing Control Strategies for Ebola Virus Transmission Dynamics through Global Sensitivity** by J. A. Akinyemi, B. O. Ajala, M. I. Ekum & O. K. Oluwadoyinsayemi



**AM 05: Comparism of Electromagnetic Radiation of Radio Waves Propagation Pattern in Kogi Central with Kogi West in Kogi State, Nigeria** by M. Gbalaja

**AM 06: Some Properties of the Classical Le Roy Function** by O. R. Okpo

**AM 07: Collinear Equilibrium Points in the Er3bp with Albedo Effects, an Oblate Primary and a Triaxial Secondary surrounded by a Belt** by T. K. Richard & J. Singh

**AM 08: Investigating the Impact of Contact Tracing on Reproduction Number in the Dynamic Modeling of Lassa Fever** by B. O. Ajala, A. O. Adejumo, J. A. Akinyemi & M. I. Ekum

**AM 09: Semi-Analytical Solution of Mathematical Modelling of Transmission and Control of Rabies Incorporating Vaccination Class using Adomian Decomposition Method (Adm)** by S. A. Somma, R. T. Balogun, N. I. Akinwande & N. O. Abdurrahman

**AM 10: Solutions of Fractional Differential Models by using Sumudu Transform Method and its Hybrid** by M. O. Aibinu & F. Z. Mahomed

**AM 11: Transformation of Normal-Power to Normal: Application to Modelling Blood Pressure using Machine Learning Algorithm** by M. I. Ekum, J. A. Akinyemi, B. O. Ajala & A. S. Ogunsanya.

**AM 12: Research on the Ultimate Boundedness of Solutions of Third Order Nonlinear Differential Equations** by D. O. Adams

**AM 13: Thermal Radiation and Propagation of Tiny Particles in Magnetized Eyring-Powell Binary Reactive Fluid with Generalized Arrhenius Kinetics** by E. O. Fatunmbi, S. O. Salawu

**AM 14: Analysis of Boundary Layer Flow near a Moving Vertical Porous Plate Influenced by Nonlinear Thermal Radiation Having Convective Boundary Condition** by G. Samaila

**AM 15: Mathematical Model of Drugs Diffusion through Oral Administration and Intravenous Infusion** by L. M. Kwaghkor

**AM 16: Interpolation Numerical Solution of Irregular Interval** by A. A. Hassan, K. D. Muhammad, S. I. Salamatu & T. Z. Nasiru

**AM 17: Analytical Study of Movement of Oil in a Quadrangular Channel using Diffusion Magnetic Resonance Equation** by S. I. Yusuf & O. J. Okosun

**AM 18: Mathematical Analysis of a Tuberculosis Model with Imperfect Vaccine** by A. Egonmwan

**AM 19: Mathematical Model for Diphtheria Outbreak Management in Nigeria via Vaccination, Enhanced Surveillance, and Effective Quarantine with Social Distancing Measures** by H. O. Orapine, A. C. Ine & D. J. Washachi

**AM 20: Numerical and Analytical Solutions of Heat and Mass Transfer of Casson Nanofluid Flow with Convective Boundary Conditions** by S. J. Aroloye, O. J. Fenuga & I. O. Abiala

**AM 21: Covid-19 Outbreak and Mitigation by Movement Restrictions: a Mathematical Assessment of Economic Impact on Nigerian Households** by A. A. Ayode

**AM 22: Mathematical Analysis of the Endemic Dynamics of Cholera Transmission Incorporating Optimal Control Measures in Nigeria** by J. K. Odeyemi & M. O. Durojaye

**AM 23: Mathematical Modelling and Analysis of Cholera Dynamics via Vector Transmission** by L. M. Anteneha & R. G. Kakai

**AM 24: Optimal Control of the Effect of Intervention Strategies on the Transmission Dynamics of Covid-19 in Nigeria** by D. O. Daniel

**AM 25: Mathematical Model for Conversion of Groundwater Flow from Confined to Unconfined Aquifers with Power Law Processes** by M. I. C. Morakaladi & A. Atangana

**AM 26: Dynamic Behaviour of Elastic Beam System Subjected to Distributed Moving Load** by S. T. Ayeni

**AM 27: Modified Hybrid Procedure for Direct Integration of Third and Fourth-Order Initial Value Problems** by O. O. Olanegan & E. O. Adeyefa

**AM 28: An Improved Block Backward Differentiation Formula for Stiff Differential Equations** by C. E. Abhulimen C.E & E. O. Amuno

**AM 29: Applied Mathematics Simulation Programming for Industrial and Computer Application** by J. O. Odejimi

**AM 30: The Analytical Solution to Unsteady Flow of Dusty Bingham Fluid Between Two Parallel Riga Plates with Radiation Effects** by O. W. Lawal, Q. D. 'Soliu & A. B. Sikiru

**AM 31: Geo-Mathematical Modelling of Groundwater Exploration: A Case Study of Araromi Village, Owo, Ondo State** by O. E. Oyanameh, P. O. Evans, & S. I. Okoro

**AM 32: Block Method Coupled with the Compact Difference Schemes for the Numerical Solution of Nonlinear Burgers' Partial Differential Equations** by B. I. Akinnukawe & E. M. Atteh

**AM 33: Heat And Mass Transfer of Mhd Casson Nanofluids Flow over a Permeable Stretching Sheet with Chemical Reaction, Dufour and Soret Effects** by F. F. Amurawaye & O. A. Gbeminiyi

**AM 34: Mathematical Assessment of the Role of Medically Vigilant and Hygienic Individuals in Typhoid Fever Dynamics** by O. L. Fatimah, T. T. Yusuf & A. Abidemi

**AM 35: Numerical Algorithm for the Solution of Fourth Order Partial Differential Equations** by U. Mohammed, H. Abdullah & J. Garba

**AM 36: AI-Driven Risk Management Strategies in Financial Derivatives using Mathematical Analysis** by O. V. Olisama, O. K. Akudo, & A. P. Bankole

**AM 37: Mathematical Modeling for Crevice and Pitting Corrosion in Petroleum Industry** by B. O Oyelami, O. Abiri, S. Oluwaniyi & C. Ekeocha

**AM 38: Controllability of Impulsive Systems and Applications to some Physical and Biological Control Systems** by B. O. Oyelami

**AM 39: Exact Solution to (Six by One) Space-Time Fokas Fractional Order Partial Differential Equations** by E. G. Rapheal & B. O. Oyelami

**AM 40: Models for Computing Effect of Particulate Matters and Microbes on Human Lower Respiratory Tracts** by P. Mebine, B. O. Oyelami

**AM 41: On the Spatiotemporal Analysis of Infectious Diseases in Nigeria (A Case Study of Covid-19)** by O. Okonkwo

**AM 42: Mathematical Approaches Towards Healing of Wounds with Underlying Sickness** by O. M. Badejo & O. K. Ogunbamike

**AM 43: On The Modelling of Temperature Distribution in Convective Straight Fins with Variable Thermal Conductivity and Heat Transfer Coefficient** by P. Mebine

**AM 44: Homotopy Perturbation Series Method for Mhd-Effectuated Boundary Layer Flow with Convective Heat Transfer over a Flat Plate** by P. Mebine

**AM 45: On Unsteady Radiative Flow Field of Chemically Reactive Casson Nano-Material Generated by a Convectively Heated Revolving Cone using Bvp4c** by R. A. Mustapha, A. M. Salau, J. K. Oyeniran, F. Abbas, L. T. Raheem & S. A. Samuel

**AM 46: Exploration of Hydromagnetic Reactive Micropolar Dusty Fluid Flow over a Paraboloid Revolution with Exponential Heat Source** by E. O. Fatunmbi & O. O. Akanbi

**AM 47: Stability Analysis of the Model of Solid Waste Management** by N. O. Abdurrahman, M. O. Ibrahim & J. O. Ibrahim

## **STATISTICS & DATA SCIENCE**

**ST 01: Robust Shrinkage Principal Component Parameter Estimator for Combating Multicollinearity and Outliers' Problems in a Poisson Regression Model** by K. C. Arum, F. I. Ugwuowo & H. E. Oranye

**ST 02: The Role of Teachers in Promoting Sustainable Mathematics Early Childhood Education in The Fourth Industrial Revolution In Nigeria** by D. M. Onojah

**ST 03: On Effectiveness of Bayesian Modelling of Nominal Scored Responses over Frequentist Technique** by O. M. Adetutu, W. B. Yahya & A. Abdulraheem

**ST 04: Concept of Dyscalculia in the Learning of Mathematical Skills by Children with Learning Disabilities** by M. A. Gbadegesin

**ST 05: Predicting Breast Cancer Subtypes using Multinomial Regression Model** by H. E. Oranye, F. O. Urmama & K. C. Arum.

**ST 06: A New Combined Estimator of the Linear Regression Model for Handling Multicollinearity Problem** by K. C. Arum, V. C. Igwe, H. E. Oranye, T. E. Ugah, T. O. Alakija & N. G. Okoacha

**ST 07: Grading The Pandemic: A Statistical Examination of Academic Shifts Post-Covid** by N. G. Okoacha, K. C. Arum, M. O. Obasimba

**ST 08: Bayesian Analysis of Theft Crime and Unemployment Rates in the South-Western Part of Nigeria** by O. B. Akanbi

**ST 09: Predictive Modelling of Heavy Tailed Distributions** by K. I. Ekerikevwe & T. O. Olatayo

**ST 10: A Bayesian Approach to Generalized Linear Mixed Models (Glm) with Count Data**

**ST 11: On Marshall-Olkin Inverse Rayleigh Distribution and its Applications** by O. L. Aako, I. O. Adegbite, S. O. Are & E. K. Shobanke

**ST 12: A Stochastic Model of Epidemic Infectious Disease in Nigeria: A Case Study of Tuberculosis** by O. C. Nwajieze, E. B. Nkemnole

**ST 13: Parameter Estimations on the Effects of Direct and Indirect Factors on Stress Level and Mental Stability of University Students** by P. O. Evans, S. I. Okoro & L. T. Wilfred

**ST 14: Application of Queueing Theory to Enhance Efficiency and Patient Satisfaction in Antenatal Care Unit** by A. I. Adewole, A. A. Adeogun & D. A. Aderinkola

**ST 15: Internet Addiction and Personality Trait as Correlates of Undergraduate Mathematics Gender and Self Efficacy in Southwest Nigerian Universities** by A. G. Adekolu & I. R. Adeola

**ST 16: Inventory Management Tools for Decision Making (A Case Study of Ukland Builders Equipment Company, Yola Adamawa State)** by E. D. Dzarma & I. Adamu

**ST 17: Heart Disease Prediction: A Comparative Study of Optimizers Performance in Deep Neural Networks** by C. Chibuike & A. S. Ogunsanya

**AM 47: STABILITY ANALYSIS OF THE MODEL OF SOLID WASTE MANAGEMENT**

Abdurrahman, N. O.<sup>1</sup>, Ibrahim, M. O.<sup>2</sup>, Ibrahim, J. O.<sup>3</sup>

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**Abstract:** The dream of every nation is to have a nation where every scrap of trash is converted to valuable resources which can increase the gross domestic product (GDP). Waste management refers to the process of managing discarded waste materials that had served their purpose and are no longer useful. The research is aimed at converting waste to wealth. In this study, the model of solid waste management is presented as a system of equations with eight compartments. The model was checked for existence and uniqueness of solutions, the reproduction number was obtained using next generation matrix method, the stability analysis was performed and the graph of  $R_0$  against time was presented.

**Keywords:** Waste management, Stability, Solid waste, Simulation, Wealth creation