MATHEMATICAL SOCIETY OF THE PHILIPPINES

ANNUAL CONVENTION

May 15, 22, & 29, 2021

Virtually hosted by
University of the Philippines Los Baños

2021 MSP Annual Convention

(1st Virtual Convention)

Hosted by University of the Philippines Los Baños

May 15, 22, 29, 2021

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PROGRAM
AND
ABSTRACTS

2021 Annual Convention of the Mathematical Society of the Philippines

Virtual Convention
15, 22, 29 May 2021

MATHEMATICAL SOCIETY OF THE PHILIPPINES

www.mathsociety.ph

Message

For more than a year already since the community quarantine started, the Mathematical Society of the Philippines (MSP) has remained actively involved in its projects. A lot has been going on online for the MSP even if we have stopped holding face to face meetings. So far, we have been successful in our projects such as our country's participation in the 61st International Mathematical Olympiad (61st IMO, July 2020), the 23rd Philippine Mathematical Olympiad (23rd PMO, March 2021) and we are moving on towards the 62nd IMO in July 2021. This is our first virtual convention, and we planned this over a respectable number of meeting sessions over the last 6 months. I hope that we will also be successful in holding this.

This pandemic may have brought us a lot of challenges, but it has also stretched our capacities to adjust to the new situation. It has pushed us to be more creative and look for alternative ways of doing things. This applies to our work, our teaching, our research and even to our daily lives. For some of us, doing mathematics could have been a way to keep our minds busy and to keep ourselves from being anxious about the uncertainties. Some of our colleagues have also applied their mathematical expertise to provide our community and government agencies with information relevant to decision-making as we tackle this health crisis. Indeed, mathematics, whether we do it as job, as a field of study, or as a tool to understand phenomena or solve problems that confront our world, may be considered an indispensable or essential part of our lives. At least for many of us who are attending this conference.

This year, we have about a hundred contributed talks in the different areas of mathematics and five plenary talks. We are deviating a bit from the usual three-consecutive-day format since it may not be easy sitting all day for three successive days in front of the computer screen. From the logistical perspective, this is also the way to go since we are all busy with our online work and classes during the weekdays. I would like to thank the University of the Philippines Los Baños for graciously accommodating us to host this event virtually.

To all our participants, I would like to welcome you all to our first virtual convention. It is good to see you all again even if only virtually. This year, we may not have the opportunity to see interesting places, taste new dishes, or find new experiences but we get to see ourselves doing things differently and becoming good at it. And hopefully, we will be able to gather again next year, physically at our next convention.

Stay safe and healthy.

Emmanuel A. Cabral, PhD (sgd)
President
Mathematical Society of the Philippines

UNIVERSITY OF THE PHILIPPINES LOS BAÑOS

Office of the Chancellor

MESSAGE

On behalf of the University of the Philippines Los Baños (UPLB), I welcome all the participants to the *2021 Mathematical Society of the Philippines Convention*. I also commend the Mathematical Society of the Philippines for leading and organizing this timely and engaging event.

This year's convention aims to bring together researchers and educators in all areas of pure and applied mathematics, mathematics education, computing, and statistics to share their current research. The event also aims to serve as a platform for discussing some of the latest developments in mathematics and mathematics education.

As this occasion presents an excellent opportunity to set the groundwork for possible future collaborations, I encourage all participants to join as many discussions and plenary sessions as possible to make the most out of this occasion.

As the country's National University, the University of the Philippines, particularly UPLB, supports events and initiatives that contribute to the advancement of mathematics and related fields.

I wish everyone a fruitful and productive convention.

JOSE V. CAMACHO, JR.
Chancellor

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Schedule of Activities

15 May 2021

8:00am - 08:30am	**Registration / Video Viewing**
8:30am - 9:00am	**Opening Ceremony** **National Anthem** **Invocation** **Welcome Remarks** **Dr. Emmanuel A. Cabral** *President, MSP* **Dr. Jose V. Camacho, Jr.** *Chancellor, UP Los Baños*
9:00am - 10:00am <9:00pm -10:00pm, Friday, USA>	**Plenary Talk 1** **Successfully Mentoring Students at All Levels in Mathematics Research**  **Dr. Michael Dorff** *Professor,* Brigham Young University *Founder and Director,* NSF-Funded Center for Undergraduate Research in Mathematics **Moderator**: *Fidel R. Nemenzo*
10:00am-10:30am	**Coffee Break**

10:30am - 12:00nn **Parallel Sessions**

AM Session	Analysis 1	Graph Theory 1	Applied Mathematics 1
Moderators	*Rhudaina Z. Mohammad*	*Ma. Carmen V. Amarra*	*Maica Krizna A. Gavina*
Assistant Moderators	*Mark Philip F. Ona*	*Yvette F. Lim*	*Mark Lexter D. De Lara*
10:30-10:45	Subshift Associated with Beta Cantor Series Expansion *Shiela Demegillo*	Resolving Restrained Domination in Graphs *Gerald B. Monsanto*	Modelling Stigmatization and Optimal Control *Remilou F. Liguarda*
10:45-11:00	Heuristic Discrepancy Principle for Landweber Iteration in Banach Spaces *Rommel Real*	Global Hop Domination Numbers of Graphs *Gemma P. Salasalan*	Data Graduation using Sobolev Polynomials *CJ Castillo*
11:00-11:15	An Alternative Definition of the Ito Integral for the Hilbert-Schmidt-Valued Stochastic Process *Mhelmar A. Labendia*	A Condition for 3-Minimal Graphs with a Triangle for Non-stable Subsets *Wielson M. Factolerin*	Wave Attenuation of Mangroves in Manila Bay *Renier Mendoza*
11:15-11:30	A Comparison of the Dynamical Behavior of IS-LM Models with Different Tax Collection Lag Schemes *Juancho A. Collera*	On the Functoriality of Directed Clique Homology over Digraphs *Paul Samuel P. Ignacio*	Parameter Identification in Neutral Delay Differential Equations using Genetic Algorithm with Multi-Parent Crossover *Cristeta U. Jamilla*
11:30-11:45	An Uncertainty for Inversion via Metric Projections onto Level Sets *Ariel L. Babierra*	The Connected Partition Dimension of Truncated Wheels *Lyndon L. Lazaro*	A Study on Optimal Strategies to Control Schistosomiasis in Agusan del Sur, Philippines *Jayrah Bena E. Riñon*
11:45-12:00	Stability Switches and Hopf Bifurcation of a Delayed Coupled Neuron System *Ronnel John A. Garcia*	Sigma Chromatic Number of the Middle Graph of Some Families of Graphs *Jay-R A. Manamtam*	Implementing an *N*-Dimensional Golden Section Search as a Modified Local Search for an Accelerated Gradient Descent *Rey Audie S. Escosio*

12:00nn – 1:30pm **Lunch Break**

1:30pm – 2:30pm **Plenary Talk 2**

Future Thinking with the Mathematical Community

Dr. Jomar Rabajante
Professor, University of the Philippines Los Baños
Junior Associate, Quantitative Life Sciences Group, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy

Moderator: *Aurelio A. de los Reyes V*

2:30pm - 3:00pm **Coffee Break/Photo Op**

3:00pm - 5:00pm **Parallel Sessions**

PM Session	Algebra 1	Mathematical Physics	Applied Mathematics 2
Moderators	*Manuel Joseph C. Loquias*	*Gilbert R. Peralta*	*Renier G. Mendoza*
Assistant Moderators	*Ma. Nerissa M. Abara*	*Jhunas Paul T. Viernes*	*Angelyn R. Lao*
3:00-3:15	Incidence Spaces Induced by Small Groups *John Mel T. Dacaymat*	Breakdown of Spacetime Continuum Alters the Temperature and Masses of Main-Sequence Stars *Adrian G. Abac*	Finding Chaos *Luis F. Razon*
3:15-3:30	Morphism and Cofinal Subsystem of Inverse Systems of BE-algebras *Jimboy R. Albaracin*	Quantum Coadjoint Orbit of the Similitude Group *Alexander J. Balsomo*	Reaction Networks: Independent Decompositions and Applications *Bryan S. Hernandez*
3:30-3:45	On a Variant of the Jordan-Schwinger Map for Finite-Dimensional Lie Algebras *Lynnel D. Naingue*	Long-Term Dynamics of Stuart-Landau and Kuramoto Models with Nonlocal Coupling *Junius Wilhelm G. Bueno*	Reaction Network Decompositions and Complex Balanced Equilibria *Honeylou F. Farinas*

PM Session	Algebra 1	Mathematical Physics	Applied Mathematics 2
Moderators	*Manuel Joseph C. Loquias*	*Gilbert R. Peralta*	*Renier G. Mendoza*
Assistant Moderators	*Ma. Nerissa M. Abara*	*Jhunas Paul T. Viernes*	*Angelyn R. Lao*
3:45-4:00	On the Positive Integer Solutions of the Diophantine Equation $M_p^x - (M_q + 1)^y = z^2$ where M_p and M_q are Mersenne Primes *William S. Gayo, Jr.*	Coherent Frames Based on Homogeneous Lie Groups *Luis S. Silvestre Jr.*	Common Complexes of Decompositions and Complex Balanced Equilibria *Lauro L. Fontanil*
4:00-4:15	***Break***		
4:15-4:30	On the Diophantine Equations $p^{qx} \pm (p^q + 1)^y = z^2$ and $(p^q + 1)^x - p^{qy} = z^2$ *Anna Clarice M. Yanday*	Coherent State Quantization of Time of Arrival Functions *Daisy A. Romeo*	Concentration Robustness in Power Law Kinetic Systems *Noel T. Fortun*
4:30-4:45	Coverability of Substitution Subshifts *Jane D. Palacio*	Wigner-Weyl Formalism on the Euclidean Motion Group of Rank Three *Laarni B. Natividad*	A Computational Approach to Multistationarity in Poly-PL Kinetic Systems *Daryl M. Magpantay*
4:45-5:00		Weyl-Wigner Formalism on Finite Quantum Systems *Francis D. Delloro*	PL-NDK Systems - a Forgotten Frontier? *Eduardo R. Mendoza*

22 May 2021

8:30am - 9:00am **Registration / Video Viewing**

9:00am - 10:00am <9:00pm -10:00pm, Friday, USA>

Plenary Talk 3

The Reformulation and Numerical Solution of Certain Nonclassical Initial/Boundary Value Problems

Dr. Graeme Fairweather
Professor Emeritus, Department of Mathematical and Computer Sciences
Colorado School of Mines
Executive Editor Emeritus, AMS Mathematical Reviews

Moderator: *Carlene P. Arceo*

10:00am-10:30am **Coffee Break**

10:30am - 12:00nn **Parallel Sessions**

AM Session	**Analysis 2**	**Education and Society**	**Applied Mathematics 3**
Moderators	*Randy L. Caga-anan*	*Levi E. Elipane*	*Louie John D. Vallejo*
Assistant Moderators	*Richard B. Eden*	*Adjani S. Aguilar*	*Dylan Antonio S.J. Talabis*
10:30-10:45	θ_s-Continuity of Maps in the Product Space and Some Versions of Separation Axioms *Javier A. Hassan*	Mathematical Modeling Activities in Philippine Tertiary Classrooms: A Praxeological Approach *Joseph Simon V. Madriñan*	Forecasting Philippine Financial Time Series Data using Weighted Support Vector Regression Based on Quantum Finance Model *Hanna Rhae Lyssa D. Improso*

AM Session	Analysis 2	Education and Society	Applied Mathematics 3
Moderators	*Randy L. Caga-anan*	*Levi E. Elipane*	*Louie John D. Vallejo*
Assistant Moderators	*Richard B. Eden*	*Adjani S. Aguilar*	*Dylan Antonio S.J. Talabis*
10:45-11:00	System of Appell Polynomials Associated with the Fractional Poisson Measure *Jerome Bendong*	Unraveling Ethnomathematics in Panaeaba (Oyster Farming) *Jonathan O. Borbon*	Optical Character Recognition System for Baybayin Scripts using Support Vector Machine *Rodney B. Pino*
11:00-11:15	A Generalized LUMAWIG Algorithm for Computing Bottleneck Distances *Jay-Anne B. Bulauan*	A Multilayer Perceptron Neural Network Approach to Classifying Learning Modalities under the New Normal *Gernel S. Lumacad*	Parameter Identifiability of an Inuenza A Virus Model with Innate Immune Response *Ronica M. de Leon*
11:15-11:30	An Apostol-Type of Multi Poly-Genocchi Polynomials with Parameters *a, b,* and *c* *AZ D. Ababa*	Generating Small Area Estimates of Poverty Incidence in Region IV-A (CALABARZON) *Nelda A. Nacion*	Profit Dependence on Interaction Rates and Population Size of 2×2 Symmetric Games *Mark Anthony Garcia*
11:30-11:45	An Apostol-Type of Poly-Genocchi Polynomials with Parameters *a, b,* and *c* *Mark P. Laurente*	Spatiotemporal Dynamics of Canine Rabies and the Rabies Control Program in Davao City, Southern Philippines, 2005-2017 *Kenneth P. Montajes*	On the Minimum Capital Requirement of a Philippine Bank using Advanced Measurement Approach *Gertrude Thea Marie S. Reyes*
11:45-12:00	The Topology of θ_e-Open Sets *Aldison Asdain*		Absolutely Complex Balanced Kinetic Systems *Dylan Antonio S. J. Talabis*

12:00nn – 1:30pm **Lunch Break**

Plenary Talk 4

1:30pm – 2:30pm

Holographic Image Sensing

Dr. Martianus Frederic Ezerman
Senior Research Fellow, Division of Mathematical Sciences, SPMS
Nanyang Technological University, Singapore

Moderator: *Romar B. dela Cruz*

2:30pm - 3:00pm **Coffee Break/Photo Op**

3:00pm - 5:00pm **Parallel Sessions**

PM Session	Algebra 2	Graph Theory 2	Statistics
Moderators	*Herbert S. Palines*	*Isagani B. Jos*	*Daryl Allen B. Saddi*
Assistant Moderators	*John Mark T. Lampos*	*John Rafael M. Antalan*	*Lester Charles A. Umali*
3:00-3:15	Approximating a Set of Perplectic Matrices by Products with Finitely Many Factors *Aaron Pagaygay*	On Generalized Coprime Graph of a Group *Dhenmar E. Chua*	A First Order Stein Identity for Absolutely Continuous Bivariate Distributions *Lester Charles A. Umali*
3:15-3:30	2×2 Symplectic Matrices and J-Householders over $\mathbb{Z}_p$ *Romsto R. Pajarillo*	Quotient-Complete Arc-Transitive Latin Square Graphs Associated with the General Semilinear Group of Degree One *Homer Franz C. De Vera*	Bayesian Imputation for Missing Data *Azman A. Nads*
3:30-3:45	On the Perunitary Diagonalizability of PerHermitian Matrices *Mark Lexter T. De Lara*	On Dihedral Flows of Generalized Petersen Graphs Cellularly Embedded in Closed Orientable Surfaces *Francis E. Yap*	An Extended Version of the Exponentiated Weibull Distribution with Application to Positively Skewed Distributed Data *Idzhar A. Lakibul*
3:45-4:00	Graphical Stirling Numbers and Normal Ordering *Ken Joffaniel M. Gonzales*	Novel Homology-Based Centrality Measures for Weighted Graphs *John Rick Manzanares*	Estimating Treatment Effect using Complier-Average Causal Effect (CACE) Analysis for Multivariate Data *Joseph P. Abordo*
4:00-4:15	***Coffee Break***		
4:15-4:30	Similarity Isometries of Shifted Lattices *Jeanine Concepcion H. Arias*	The Vertex Choice Number of a Graph *Ryan Paolo Chua*	The Burr Type IV Distribution under Left Censored Data *Claire Joy G. Mariquit*
4:30-4:45	The Product of an Involution and a Skew-Involution *Jenny R. Salinasan*	Coprime Graphs Defined on the Dicyclic Group *Jose Maria P. Balmaceda*	Modelling Rainfall Data Using STARIMA and CNN-LSTM Models *Charly Q. Bongabong*
4:45-5:00	Dynamical Systems Arising from Two-Dimensional Random Substitutions *Bryan Ceasar L. Felipe*	The Commuting Graph of the Dicyclic Group *Yuria M. Hojo*	Time Series Analysis of Monthly Precipitation Data in Davao City *Ronald A. Gica*

29 May 2021

8:30am - 9:00am	**Registration / Video Viewing**
9:00am - 10:00am <9:00pm -10:00pm, Friday, Puerto Rico>	**Plenary Talk 5** **Fine Regularity for the Robin Problem over Irregular Regions**  **Dr. Alejandro Velez-Santiago** *Associate Professor*, Departamento de Matemáticas, University of Puerto Rico at Mayagüez **Moderator**: *Jose Ernie C. Lope*
10:00am-10:30am	**Coffee Break**
10:30am - 12:00nn	**Parallel Sessions**

AM Session		**Differential Equations**	**Applied Mathematics 4**
Moderators		*Juancho A. Collera*	*Emmanuel Lance Christopher M. Plan VI*
Assistant Moderators		*Romsto R. Pajarillo*	*Ederlina G. Nocon*
10:30-10:45		Homogenization of a Quasilinear Elliptic Problem in Domains with Small Holes *Jake M. Avila*	Single City Optimal Strategy for COVID-19 Pandemic *Dave Emmanuel Q. Magno*
10:45-11:00		Self-adjoint Laplacians on a Compact Riemann Surface with Conical Singularities and their Determinants *Kelvin A. Lagota*	Stochastic SEIR Model: Formulation, Analysis, and Application to COVID-19 Data Set *Angelo E. Marasigan*

AM Session		Differential Equations	Applied Mathematics 4
Moderators		*Juancho A. Collera*	*Emmanuel Lance Christopher M. Plan VI*
Assistant Moderators		*Romsto R. Pajarillo*	*Ederlina G. Nocon*
11:00-11:15		Hyperbolic Mean Curvature Flow at a Triple Junction *Rhudaina Z. Mohammad*	Local Dynamics of an SEIHR Epidemic Model with Application to Ebola Disease *Joseph S. Tullao*
11:15-11:30		A Model for Incompressible Viscous Two-Phase Flows with Convective Heat Transfer *Gilbert Peralta*	Linkages of Community Quarantines, Nonpharmaceutical Interventions (NPI), Weather Components, and COVID-19 Cases in Davao City, Philippines *Zython Paul T. Lachica*
11:30-11:45		Hausdorff and H_1 Convergence of Approximate Solutions of a Shape Design Problem *John Sebastian H. Simon*	Optimal Vaccination Control for COVID-19 in a Metapopulation Model with Mobility *Jead M. Macalisang*
11:45-12:00		Generalized Mittag-Leffler Kernels and Generalized Scaling Operators in Mittag-Leffler Analysis *Angelyn P. Gumanoy*	Modeling Super-spreading Events for Infectious Diseases with Quarantine *Thomas Herald M. Vergara*

12:00nn – 1:30pm **Lunch Break**

1:30pm - 2:45pm **Parallel Sessions**

PM Session	Analysis 3	Discrete Mathematics	Applied Mathematics 5
Moderators	*Eduardo O. Jatulan*	*Ken Joffaniel M. Gonzales*	*Gino Angelo M. Veslasco*
Assistant Moderators	*Shiela S. Demegillo*	*Mark C. Tolentino*	*Bryan S. Hernandez*
1:30-1:45	A q-Analogue of Generalized Translated Whitney Numbers: Cigler's Approach *Jezer C. Fernandez*	On the Structure of $\mathbb{Z}_n$ via PascGalois JE *Irmalyn B. Paymalan*	Effect of Pedestrian Leaders on the Evacuation Efficiency of a Crowd *Jhunas Paul Viernes*
1:45-2:00	The Order Convergence Theorem and Its Consequences *Joseph T. Belida*	Tournament Score Sequences: Enumeration and Realization *Severino V. Gervacio*	On The Dynamics of Crop Model with Biological Pest Control *Nurhaya C. Kabirun*

PM Session	Analysis 3	Discrete Mathematics	Applied Mathematics 5
Moderators	*Eduardo O. Jatulan*	*Ken Joffaniel M. Gonzales*	*Gino Angelo M. Veslasco*
Assistant Moderators	*Shiela S. Demegillo*	*Mark C. Tolentino*	*Bryan S. Hernandez*
2:00-2:15	A *(p, q)*-analogue of Qi-Type Formula for *r*-Dowling Numbers *Amerah M. Dibagulun*	On the Computation of Some Distance-Based Topological Indices of Circulant Network $C_n(1, a)$ *John Rafael M. Antalan*	A Lattice Lotka-Volterra Simulation Study of the Understory Plant Communities *Gimelle B. Gamilla*
2:15-2:30	Translated Logarithmic Lambert Function and its Applications to Three-Parameter Entropy *Roberto B. Corcino*	Inequivalent Polyomino and Polyiamond Prototiles for Isohedral Tilings with Four-Fold, Three-Fold, and Six-Fold Rotational Symmetries *Aimah M. Domado*	A Pressure Model for the Interaction of Actin Filaments in Biological Cell Cytoskeleton *Gervy Marie Angeles*
2:30-2:45	Asymptotic Approximations of Apostol-Genocchi Numbers and Polynomials *Cristina B. Corcino*		Activity Pulses Induce Spontaneous OW Reversals in Viscoelastic Environments *Emmanuel L. C. VI M. Plan*

2:45pm – 3:00pm	**Coffee Break/ Photo Op**
3:00pm - 3:30pm	**Awarding and Presentation** **of the 2021 Outstanding PhD Graduate Awardee**
3:30pm - 5:30pm	**MSP Business Meeting** **Closing Remarks**

Masters of Ceremonies: *Jude C. Buot* and *Len Patrick Dominic M. Garces*

Mathematical Symposium in Memory of Prof. Noli Reyes

(A Satellite Symposium of the Mathematical Society of the Philippines)

Date: June 5, 2021

Programme

9:00 am	**Opening** **Welcome Remarks** **Dr. Jose Ernie C. Lope** *Director, Institute of Mathematics* **Dr. Fidel R. Nemenzo** *Chancellor, University of the Philippines Diliman* **Dr. Emmanuel A. Cabral** *President, Mathematical Society of the Philippines*
9:30 am	**Plenary Talk** **Reconstruction of Functions from Prescribed Proximal Points** *Prof. Patrick L. Combettes*
10:30 am	**Break**
10:35 am	**Invited Talks** **A Trail of Uncertainties from Nonlinear Mappings to Metric Projections** *Dr. Ariel L. Babierra* **Growth of Approximate Solutions of Inconsistent Systems** *Dr. Louie John D. Vallejo*
11:40 am	**Lunch Break**

1:00 pm	**Invited Talks** **Volume-preserving Gradient Flows of Surface Energies** Dr. Rhudaina Z. Mohammad **Fourier Transform from Various Perspectives** Dr. Jayson Cunanan
2:00 pm	**Break**
2:05 pm	**Invited Talks** **Spaces of Functions of Variable Bandwidth Parametrized by Piecewise Constant Functions** Mr. Mark Jason Celiz **Optimization in the Construction of Multidimensional Wavelets** Mr. Neil Kristofer Dizon
3:05 pm	**Break**
3:10 pm	**Invited Talks** **On the Atangana-Baleanu Derivative** Dr. Johnatan Pimentel **Phase Retrieval for Wide Band Signals** Mr. Rolando Perez III
4:10 pm	**Break**
4:15 pm	**Invited Talk** **On Phase-Space Localization and Mixed-State Localization Operators** Dr. Gino Angelo M. Velasco
4:45 pm	**Closing Remarks**