
MASTER PROGRAM

for

**NINTH INTERNATIONAL CONFERENCE
*APPLICATION OF MATHEMATICS IN TECHNICAL AND NATURAL
SCIENCES*
ALBENA, JUNE 21-26, 2017**

TUESDAY, JUNE 20, 2017

17:00-19:00 REGISTRATION
Flamingo Grand Hotel – 3rd floor

WEDNESDAY, JUNE 21, 2017

- 07:30-08:30 REGISTRATION
Flamingo Grand Hotel – 3rd floor
- 08:30-09:00 OPENING (Flamingo Grand Hall)
- 09:00-10:00 PLENARY LECTURE: Peter Minev
Title: *Recent Splitting Schemes for The Incompressible Navier-Stokes Equations*
- (Flamingo Grand Hall)
Chair: Michail Todorov

10:00-10:30 COFEE BREAK

Parallel Session APPLIED ANALYSIS
(Flamingo Grand Hall)
Chair: Nevena Ilieva

- 10:30-11:00 Speaker: Boris Ananyev
Title: *A Guaranteed State Estimation of Linear Retarded Neutral Type Systems*
- 11:00-11:30 Speaker: Serpil Pehlivan
Title: *Some Types of Convergence of Sequences of Functions*
- 11:30-12:00 Speaker: Irina Bashkirtseva
Title: *Analysis of Stochastic Phenomena in Ricker-Type Population Model with Delay*

Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Corella Hall)
Chair: Peter Minev

- 10:30-11:00 Speaker: Nectarios Papanicolaou
Title: *Numerical Investigation of Biofilm Growth in Microgravity*

11:00-11:30	Speaker: Valentin Gushchin Title: <i>The Interaction of a Vortex Pair with A Free Surface</i>
11:30-12:00	Speaker: Evgenii Karabut/Elena Zhuravleva Title: <i>Semi-Analytical Investigation of Unsteady Free-Boundary Flows</i>
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12:00-14:00	LUNCH
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14:00-15:00	Parallel Session MATHEMATICAL PHYSICS AND TRANSPORT PROCESSES (Flamingo Grand Hall) Chair: Elena Zhuravleva
14:00-14:30	Speaker: Nicolae Tarfulea Title: <i>On Solving Constrained Wave Equations</i>
14:30-15:00	Speaker: Andrei Tarfulea Title: <i>Improved Estimates for Thermal Fluid Equations</i>
15:00-16:00	Parallel Session APPLIED ANALYSIS (Flamingo Grand Hall) Chair: Elena Zhuravleva
15:00-15:30	Speaker: Lev Ryashko Title: <i>Modeling and Stochastic Analysis of Dynamic Mechanisms of The Perception</i>
15:30-16:00	Speaker: Tsvetan Ostromsky Title: <i>Solving the Displacement problem in a Geodesic Polygon with Exact Length Edges and Small Angle Errors</i>
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14:00-16:00	Parallel Session SCIENTIFIC COMPUTING (Flamingo Grand Corella Hall) Chair: Nectarios Papanicolaou
14:00-14:30	Speaker: Argus Dunca

Title: *Numerical Studies of a Fixed Point Iteration Approach For Approximate Deconvolution Models*

14:30-15:00

Speaker: Jianzhen Qian

Title: *The Generalized Riemann Solvers and GRP Schemes for Compressible Fluid System*

15:00-15:30

Speaker: Shudao Zhang

Title: *An Effective 3D MMALE Method for Compressible Fluid Dynamics*

15:30-16:00

Speaker: Lili Wang

Title: *Numerical Study on The Turbulent Mixing Due to RT and RM Instabilities in The Imploding Problem*

16:00-16:30

COFEE BREAK

16:30-18:30

Parallel Session APPLIED ANALYSIS

(Flamingo Grand Hall)

Chair: Ivanka Zheleva

16:30-17:00

Speaker: Natalia Kolkovska

Title: *Orbital Stability or Instability of Solitary Waves to Boussinesq Paradigm Equation with Quadratic-Cubic Nonlinearity*

17:00-17:30

Speaker: Elena Butsenko/Andrey Shorikov

Title: *Network Models for Solving the Problem of Multicriterial Adaptive Optimization of Investment Projects Management with Several Acceptable Technologies*

17:30-18:00

Speaker: Andrey Shorikov

Title: *Algorithm for Solving of Two-Level Hierarchical Minimax Program Control Problem of Final State the Regional Socio-Economic System in the Presence of Risks*

18:00-18:30

Speaker: Ivanka Stamova

Title: *Impulsive Control on The Mittag-Leffler Stability of*

Fractional-Order BAM Neural Network Systems with Time Varying Delays

- 16:30-18:30 Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Corella Hall)
Chair: Shudao Zhang
- 16:30-17:00 Speaker: Anastasia Galaktionova
Title: *Computation of Seismic Wave Fieldkinematics in a Three-Dimensional Heterogeneous Isotropic Medium*
- 17:00-17:30 Speaker: Anna Efimova
Title: *PIC-Simulation of The Electron Beam Interaction with Modulated Density Plasma*
- 17:30-18:00 Speaker: Ivan Zubko
Title: *Choosing Internal Degree of Freedom for Damage Formation by Discrete Atomistic Analysis*
- 18:00-18:30 Speaker: Grigory Parshikov
Title: *On Resource-Efficient Algorithm for Nonlinear Systems Approximate Reachability Set Construction*
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- 20:00 WELCOME PARTY – Ganvie Beach Club
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THURSDAY, JUNE 22, 2017

08:30-09:30 PLENARY LECTURE: Semyon Tsynkov
Title: *Spaceborne SAR*

(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFFEE BREAK

10:00-12:00 Symposium “Statistical and Stochastic Modeling”
(Flamingo Grand Hall)
Chair: Milan Stehlik

10:00-10:30 Speaker: Milan Stehlik
Title: *On Flexible Modeling of Generalized Interest Rate*

10:30-11:00 Speaker: Pavlina Jordanova
Title: *Inverse Log-Gamma-G Processes*

11:00-11:30 Speaker: Alexander Nepp
Title: *Econometric Modeling of The Impact of Religion on Macroeconomic Parameters*

11:30-12:00 Speaker: Armine Amiryan
Title: *Harmonizing The Incomplete Statistical Data on The Example of Institutional Factors’ Impact on Pension Systems*

10:00-12:00 Parallel Session BIOMATHEMATICS
(Flamingo Grand Jaco Hall)
Chair: Semyon Tsynkov

10:00-10:30 Speaker: Victor Olevskiy
Title: *Fuzzy Recognition Method of High Molecular Substances in Evidence-Based Biology*

10:30-11:00 Speaker: Erchin Serpedin
Title: *A Robust PCA-Based Algorithm for Metagenomic*

Biomarker Detection

- 11:00-11:30 Speaker: Nicoleta Tarfulea
Title: *A Latently Infected Cell Inclusive Model for HIV Treatment with Time-Varying Antiretroviral Therapy*
- 11:30-12:00 Speaker: Sander Paekivi
Title: *Memory Effects on a Resonate-And-Fire Neuron Model Subject to Ornstein-Uhlenbeck Noise*

12:00-14:00 LUNCH

Flamingo Grand Hall
Chair: Michail Todorov

- 14:00-14:45 KEYNOTE LECTURE: Hristo Kojouharov
Title: *Modeling the Effects of the Immune System on Bone Fracture Healing*
- 15:00-16:00 Symposium “Statistical and Stochastic Modeling”
(Flamingo Grand Hall)
Chair: Milan Stehlik
- 15:00-15:30 Speaker: Pece Mitrevski - cancelled
Title: *On the Numerical Solution vs. Discrete-Event Simulation of Fluid Stochastic Petri Net Models*
- 15:30-16:00 Speaker: Irina Hvozdeva
Title: *The Method of Trend Analysis of Gas Turbine Engine Parameters in Long-Term Operation*
- 15:00-16:00 Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Jaco Hall)
Chair: Hristo Kojouharov
- 15:00-15:30 Speaker: Nevena Ilieva
Title: *Biomolecule Modeling: Conformation Studies in Coarse-*

Grain Approaches

15:30-16:00 Speaker: Elena Lilkova
Title: *Studying The Asymmetry in The hIFN γ Homodimer Using Molecular Dynamics Simulations*

16:00-16:30 COFEE BREAK

16:30-18:30 Symposium “Statistical and Stochastical Modeling”
(Flamingo Grand Hall)
Chair: Milan Stehlik

16:30-17:00 Speaker: Petras Rupsys
Title: *Influence of Noise on Decay Predictions in Standing Trees*

17:00-17:30 Speaker: Maya Stoimenova
Title: *Regression Trees Modeling and Forecasting of PM10 Air Pollution in Urban Areas*

17:30-18:00 Speaker: Ivanka Zheleva
Title: *Analysis and Modeling of Daily Air Pollutants in The City of Rouse, Bulgaria*

18:00-18:30 Speaker: Margarita Filipova
Title: *Mathematical Modeling of the Heat Transfer during Pyrolysis Process Used for End-of-Life Tires Treatment*

16:30-17:30 Parallel Session NEW TRENDS IN INFORMATION TECHNOLOGIES
(Flamingo Grand Jaco Hall)
Chair: Rossen Ivanov

16:30-17:00 Speaker: Marcin Paprzycki
Title: *Combining Semantic Technologies with a Content-Based Image Retrieval System - Preliminary Considerations*

17:00-17:30 Speaker: Marcin Paprzycki

Title: *Building a Platform to Collect Crowdsensing Data – Preliminary Considerations*

17:30-18:00

Parallel Session MATHEMATICAL PHYSICS AND
TRANSPORT PROCESSES
(Flamingo Grand Jaco Hall)
Chair: Rossen Ivanov

17:30-18:00

Speaker: Victor Lyashenko/Anton Zaika
Title: *Generalized Mathematical Model of Heat Conduction in a Complex Multi-Layered Area*

FRIDAY, JUNE 23, 2017

08:30-09:30 Flamingo Grand Hall
Chair: Michail Todorov

PLENARY LECTURE: Vladimir Shaydurov
Title: *Numerical Method for Mean Field Games in Management*

09:30-10:00 COFEE BREAK

10:00-12:00 Parallel Session CONTINUUM MECHANICS
Flamingo Grand Hall
Chair: Vladimir Shaydurov

10:00-10:30 Speaker: Yulia Olevska
Title: *Asymptotic Estimation of Free Vibrations of Nonlinear Plates with Complicated Boundary Conditions*

10:30-11:00 Speaker: Wentao Liu
Title: *Shock-induced Microspall in Tin Plate*

11:00-11:30 Speaker: Min Yang
Title: *Study on Turbulent Mixing Induced by Rayleigh-Taylor Instability Using The BHR $k-S-a-b$ Model*

11:30-12:00 Speaker: Dobri Dankov
Title: *Numerical Simulation of Pulsed Pirani Sensor Mems*

10:00-11:00 Parallel Session BIOMATHEMATICS
(Flamingo Grand Jaco Hall)
Chair: Ivanka Zheleva

10:00-10:30 Speaker: Elena Nikolova
Title: *Evolution of Nonlinear Waves in a Blood-filled Artery with an Aneurysm*

10:30-11:00 Speaker: Michail Todorov/Anna Antonova

Title: *The Dynamics of Two Linearly Coupled Goodwin Oscillators*

11:00-12:00 POSTER SESSION
(Flamingo Grand Jaco Hall)

Vyacheslav Glinskikh
Title: *High-Performance Computing on GPUs for Resistivity Logging of Oil and Gas Wells*

12:00-12:30 LUNCH

12:30-19:30 EXCURSION TO PLISKA - THE CAPITAL OF THE FIRST BULGARIAN STATE (7-9 CENTURY AD) AND THE MADARA RIDER (8 CENTURY AD)

SATURDAY, JUNE 24, 2017

08:30-09:30 PLENARY LECTURE: Istvan Farago
Title: *Some Adequate Discrete Models in Biomathematics*

(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFEE BREAK

10:00-12:00 Special Session COMPUTATIONAL MEDICINE
(Flamingo Grand Hall)
Chair: Natalia Trayanova

10:00-10:30 Speaker: Natalia Trayanova
Title: *Computational Cardiology*

10:30-11:00 Speaker: Donald Gaver
Title: *Reduced Dimension Modeling of
Recruitment/Derecruitment Dynamics in The Lung*

11:00-11:30 Speaker: Jason Bayer
Title: *The Development of Novel Cardiac Arrhythmia
Electrotherapies Using Computational Cardiac
Electrophysiology*

11:30-12:00 Speaker: Hermenegild Arevalo
Title: *Using Personalised Virtual Heart Models to Gain
Insights into Causes of Sudden Cardiac Death*

10:00-12:00 Parallel Session CONTINUUM MECHANICS
(Flamingo Grand Jaco Hall)
Chair: Istvan Farago

10:00-12:00 Speaker: Ivan Zubko
Title: *Material Rotation and Rate-Type Finite-Strain Elasticity*

for Two-Dimensional Oblique Medium

- 10:30-11:00 Speaker: Evgenii Chentsov
Title: *Modeling of Wave Processes in a Blocky Medium with Fluid-Saturated Porous Interlayers*
- 11:00-11:30 Speaker: Maria Varygina
Title: *Numerical Solution of Dynamic Problems in Micropolar Plates and Shells on Supercomputers with GPUs*
- 11:30-12:00 Speaker: Andrei Kolyshkin
Title: *Convective Instability of Non-Isothermal Couette Flow Between Two Rotating Cylinders Caused by Internal Heat Generation in Accordance with the Arrhenius Law*

12:00-14:00 LUNCH

Session BIOMATHEMATICS
(Flamingo Grand Hall)
Chair: Michail Todorov

- 14:00-14:45 KENOTE LECTURE: Gabriel Dimitriu
Title: *Evolutionary Dynamics in Cancer Cell Populations and Optimal Control of Targeted Chemotherapy Delivery*

15:00-15:30 Symposium "STATISTICAL AND STOCHASTICAL MODELING"
(Flamingo Grand Hall)
Chair: Milan Stehlik

- 15:00-15:30 Speaker: Khalid Qaraqe/Erchin Serpedin
Title: *Resource Allocation in Cognitive Communication Systems via Convex Optimization*
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15:30-16:00 Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Hall)
Chair: Milan Stehlik

15:30-16:00 Speaker: Evelina Veleva
Title: *Generation of Correlation Matrices*

15:00-16:00 Parallel Session APPLIED PHYSICS
(Flamingo Grand Jaco Hall)
Chair: Gabriel Dimitriu

15:00-15:30 Speaker: Victor Olevskiy/Olexander Olevskiy
Title: *Study of Eigenfrequencies with The Help of Prony's Method*

15:30-16:00 Speaker: Dzmitry Shymanchuk
Title: *The Research of the Coupled Orbital-Attitude Controlled Motion of Celestial Body in the Neighborhood of the Collinear Libration Point L_1*

16:00-16:30 COFFEE BREAK

16:30-18:00 Parallel Session SCIENTIFIC COMPUTING
(Flamingo Grand Hall)
Chair: Milan Stehlik

16:30-17:00 Speaker: Gyulnara Voskoboynikova /Anna Efimova
Title: *Multifactor Estimation of The Ecological Risks Through Numerical Simulation*

17:00-17:30 Speaker: Milen Borisov
Title: *Maximizing the Biogas Production of a Delay Bioreactor Model via Extremum Seeking*

17:30-18:00 Speaker: Jordan Genoff - cancelled
Title: *On Three Sources of Inaccuracy in Large-Scale Molecular Mechanics Simulations*

16:30-18:00 Parallel Session APPLIED PHYSICS

(Flamingo Grand Jaco Hall)

Chair: Gabriel Dimitriu

- 16:30-17:00 Speaker: Lyudmila Prokudina
Title: *Mathematical Modeling of the Wave Surface of Non-Isothermal Liquid Film*
- 17:00-17:30 Speaker: Astrid Rekker
Title: *Interspike Interval Distribution of a Resonant-And-Fire Neuron Model Driven by a Mittag-Leffler Noise*
- 17:30-18:00 Speaker: Martin Nikolo
Title: *The Impact of Maki Parameter and Spin Orbit Scattering Constants on The WHH Model of Upper Critical Magnetic Fields in Ni- and Co- doped Pnictide Bulk Superconductors*
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- 19:30 BANQUET DINNER RESTAURANT “GREEN FOREST”,
MEETING POINT RECEPTION OF FLAMINGO GRAND
HOTEL

SUNDAY, JUNE 25, 2017

08:30-09:30 PLENARY LECTURE: Lisa Fauci
Title: *Biofluid Mechanics of Reproduction*

(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFEE BREAK

10:00-12:00 Special Session ADVANCES AND TRADITION IN SOLITON
THEORY DEDICATED TO PROFESSOR VLADIMIR
GERDJKOV ON THE OCCATION OF HIS 70TH
BIRTHDAY

(Flamingo Grand Hall)
Chair: Michail Todorov

10:00-10:30 Speaker: Vladimir Gerdjikov
Title: *Integrable Equations on Symmetric Spaces, Generalized
Fourier Transforms and Mikhailov Reductions*

10:30-11:00 Speaker: Rossen Ivanov
Title: *A Dressing Method for The Camassa-Holm Equation*

11:00-11:30 Speaker: Alan Compelli
Title: *Solitary-Wave Solution of Flat Surface Internal
Geophysical Waves with Vorticity*

11:30-12:00 Speaker: Sanichiro Yoshida
Title: *Wave Dynamics of Deformation and Fracture*

10:00-11:30 Parallel Session MATHEMATICAL PHYSICS AND
TRANSPORT PROCESSES
(Flamingo Grand Jaco Hall)
Chair: Lisa Fauci

10:00-10:30 Speaker: Vassil Vassilev

Title: *About Two-Parameter Family of Nonlinear Differential Equations*

10:30-11:00

Speaker: Galin Valchev

Title: *Van der Waals Interactions between Axisymmetric Lipid Membranes and Planar Substrate*

11:00-11:30

Speaker: Peter Djondjorov

Title: *Exact Results for the Casimir Force in a Model with Neumann-infinity Boundary Conditions*

11:30-12:00

Parallel Session NUMERICAL METHODS

11:30-12:00

Speaker: Ekaterina Dementyeva

Title: *The Semi-Lagrangian Method for the Navier-Stokes Problem for Viscous Incompressible Fluid*

12:00-14:00 LUNCH

14:00-15:00

Parallel Session APPLIED ANALYSIS
(Flamingo Grand Hall)
Chair: Vladimir Gerdjikov

14:00-14:30

Speaker: Lev Ryashko

Title: *Analysis of The Stochastically Forced Invariant Manifolds of Dynamic Systems*

14:30-15:00

Speaker: Irina Bashkirtseva

Title: *Controlling Stochastic Sensitivity by The Dynamic Regulators*

15:00-15:30

Speaker: Nikolay Kutev

Title: *Necessary and Sufficient Conditions for Finite Time Blow Up of The Solutions to Double Dispersion Equation*

15:30-16:00

Speaker: Elitsa Raeva/Velizar Pavlov

Title: *Planning Outstanding Reserves in General Insurance*

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- 14:00-16:00 Parallel Session NUMERICAL METHODS
(Flamingo Grand Jaco Hall)
Chair: Sanichiro Yoshida
- 14:00-14:30 Speaker: Miklos Mincsovcics
Title: *Stability of Linear Multistep Methods*
- 14:30-15:00 Speaker: Vasily Shmyrov
Title: *The Research of Controllable Motion in a Neighborhood of Collinear Libration Point by Conservative Methods*
- 15:00-15:30 Speaker: Svetlana Tikhovskaya
Title: *Investigation of The Numerical Differentiation Formulas of Functions with Large Gradients*
- 15:30-16:00 Speaker: Vesselina Vucheva
Title: *Numerical Investigation of Sixth Order Boussinesq Equation*
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- 16:00-16:30 COFEE BREAK
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- 16:30-17:30 Parallel Session APPLIED ANALYSIS
(Flamingo Grand Hall)
Chair: Vladimir Gerdjikov
- 16:30-17:00 Speaker: Vesela Mikhova/Velizar Pavlov
Title: *Comparative Analysis on The Probability of Being a Good Payer*
- 17:00-17:30 Speaker: Velelin Todorov
Title: *Efficient Stochastic Approaches for Sensitivity Studies of an Eulerian Large-Scale Air Pollution Model*
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- 17:30-18:00 Parallel Session APPLIED PHYSICS
(Flamingo Grand Hall)
Chair: Vladimir Gerdjikov
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- 17:30-18:00 Speaker: Mir Hashemi
Title: *Non-Classical Lie Symmetry Analysis to the Nonlinear Time-Fractional Differential Equations*
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- 16:30-18:00 Parallel Session NUMERICAL METHODS
(Flamingo Grand Jaco Hall)
Chair: Sanichiro Yoshida
- 16:30-17:00 Speaker: Anatoly Kardashevsky
Title: *An Iterative Solution of the Inverse Cauchy Problem for Elliptic Equations by Conjugate Gradient Method*
- 17:00-17:30 Speaker: Alexander Sesekin
Title: *Optimization of Layouts of Low-Rise Residential Buildings*
- 17:30-18:00 Speaker: Elena Kostousova
Title: *On Feedback Target Control for Uncertain Discrete-Time Bilinear Systems with State Constraints through Polyhedral Techniques*

MONDAY JUNE 26, 2017

08:30-09:30 PLENARY LECTURE: Alejandro Aceves
Title: *Current Trends in Nonlinear Photonics*

(Flamingo Grand Hall)
Chair: Michail Todorov

09:30-10:00 COFEE BREAK

10:00-11:00 Session SCIENTIFIC COMPUTING
(Flamingo Grand Hall)
Chair: Nikolay Kutev

10:00-10:30 Speaker: Dimiter Dimitrov
Title: *Accounting Services for Heterogeneous Computing Resources*

10:30-11:00 Speaker: Todor Gurov
Title: *ArctosPop: Programme for Estimating the Brown Bear (Ursus arctos) Population Size in Bulgaria*

11:00-12:00 Session APPLIED ANALYSIS
(Flamingo Grand Hall)
Chair: Nikolay Kutev

11:00-11:30 Speaker: Emin Ozcag
Title: *Results on Applications of Neutrix Calculus to Some Operations on Distributions*

11:30-12:00 Speaker: Natalia Zhelonkina
Title: *The Stability of Tubes of Discontinuous Solutions of Dynamical Systems*

12:00-12:30 Speaker: Ahmet Zayed - cancelled
Title: *Numerical Solutions to an Energy Concentration Problem*

Associated with the Affine Fourier Transform

- 10:00-12:00 Session NUMERICAL METHODS
(Flamingo Grand Jaco Hall)
Chair: Alejandro Aceves
- 10:00-10:30 Speaker: Alexander Matviychuk
Title: *On One Algorithm for Solution to The Control Problem
Using Sets of Guides*
- 10:30-11:00 Speaker: Oxana Matviychuk
Title: *Ellipsoidal Estimates of Reachable Sets of Impulsive
Control Problems under Uncertainty*
- 11:00-11:30 Speaker: Natalia Yaparova
Title: *Method for Solving a Problem of Nonlinear Heating a
Cylindrical Body with the Unknown Initial Temperature*
- 11:30-12:00 Speaker: Mohsen Alipour
Title: *Numerical Investigation on Fractional Variational
Problems Depending on Indefinite Integrals*
- 12:00-12:30 Speaker: Maitree Podisuk - cancelled
Title: *Numerical Solutions to an Energy Concentration Problem
Associated with the Affine Fourier Transform*
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- 12:30 RECAPITULATION AND OFFICIAL CLOSING SESSION
OF THE CONFERENCE (Falmingo Grand Hall)
- 12:45 GOOD-BYE COFEE BREAK
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