

**XXXIV International Enlarged Sessions of the Seminar  
of Ilia Vekua Institute of Applied Mathematics (VIAM)  
of Ivane Javakhisvili Tbilisi State University (TSU)**



**PROGRAM**

**Tbilisi  
2020**

Due to the Covid 19 pandemic in Georgia, the official opening of the XXXIV International Enlarged Sessions of the Seminar of Ilia Vekua Institute of Applied Mathematics of Ivane Javakhisvili Tbilisi State University will be held online

on September 16, 2020, at 14:00 using the Zoom system

The seminar sessions will work on September 17-19, 2020

### Organizing Committee

Jaiani George (Chair)  
Avazashvili Nikoloz (Co-Chair)  
Chinchaladze Natalia (Co-chair)  
Jangveladze Temur (Co-chair)  
Gulua Bakur (Scientific Secretary, Contact Person,  
email: bak.gulua@gmail.com)  
Rukhaia Mikheil (Scientific Secretary, Contact  
Person, email: mrukhaia@yahoo.com)  
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Giorgadze Grigor  
Goginava Ushangi

Gogoladze Leri  
Kharazishvili Alekhander  
Kharibegashvili Sergo  
Khimshiashvili George  
Kiguradze Zurab  
Kipiani Archil  
Koplatadze Roman  
Meunargia Tengiz  
Nadaraya Elizbar  
Natroshvili David  
Omanadze Roland  
Papukashvili Archil  
Purtukhia Omar  
Rogava Jemal  
Rukhaia Khimur  
Shavadze Tea  
Shavgulidze Ketevan  
Tadumadze Tamaz  
Vashakmadze Tamaz  
Vepkhvadze Teimuraz

(in case of co-authors, the speaker is underlined in the program)

## Wednesday, September 16

14:00 – 14:10 Opening

### Plenary Session (online, using Zoom system)

14:10 – 14:40 Paolo E. Ricci (Italy), Diego Caratelli (Netherlands)

Approximating functions of positive compact operators by using Bell polynomials

14:45 – 15:15 Johan Gielis (Belgium), Ilia Tavkhelidze

The Möbius phenomenon in generalized Möbius-Listing bodies with cross sections of odd and even polygons

15:20 – 15:50 Matthias Baaz (Austria)

The concept of proof

# Section of Mathematical Logic and Foundations

Chairs: Alexander Kharazishvili, Roland Omanadze

Co-chair: Archil Kipiani

**Saturday, September 19**  
**(online, using Zoom system)**

**10:00 - 10:20 Roland Omanadze**

Minimal pairs of  $sQ_1$ -degrees

**10:20 - 10:40 Revaz Grigolia, Antonio Di Nola (Italy), Ramaz Liparteliani**

On 2-generated free  $s_1^{\omega}$ -algebras

**10:40 - 11:00 Mariam Beriashvili**

On some measurability properties of the uniform subsets

**11:00 - 11:20 Tamar Kasrashvili**

On some properties of elementary volumes

# Section of Applied Logics and Programming

Chair: Matthias Baaz (Austria)

Co-chair: Jemal Antidze

**Thursday, September 17**  
**(online, using Zoom system)**

**10:00 - 10:20 Mikheil Rukhaia**

Unranked fuzzy logic and its applications

**10:20 - 10:40 Besik Dundua**

Probabilistic programming in PpLog

**10:40 - 11:00 Jemal Antidze**

Special approach for programming of large volume projects

# Section of Number Theory, Algebra and Geometry

Chairs: Mikhail Amaglobeli, George Khimshiashvili, Teimuraz Vepkhvadze, Malkhaz Bakuradze  
Co-chair: Ketevan Shavgulidze

**Thursday, September 17**  
**(online, using Zoom system)**

- 12:00 - 12:20 Nikoloz Avazashvili**  
On a certain numerical sequence
- 12:20 - 12:40 Mikheil Amaglobeli**  
Free constructions in categories of exponential R-group
- 12:40 - 13:00 Tengiz Bokelavadze, Tamar Kvirikashvili**  
The  $W$ -completion of an  $W$ -torsion-free group
- 13:00 - 13:20 Tengiz Bokelavadze**  
 $W$ -Isolated subgroups of hall's  $W$ -groups
- 13:20 - 13:40 Teimuraz Vepkhvadze**  
Representation functions of binary quadratic forms belonging to multi-class genera
- 13:40 - 14:00 Ketevan Shavgulidze**  
*On the upper bounds of the dimensions of some spaces of generalized theta-series*
- 14:00 - 14:20 Giorgi Khimshiashvili**  
Dual extremal problems in polygon spaces
- 14:20 - 14:40 Ilia Tavkheldze, Johan Gielis (Belgium), Sandra Pinelas (Portugal)**  
*About some methods of analytic representation and classification of a wide set of trajectories of movements geometric figures with "complex" configuration*

## Section of Real Analysis

Chairs: Ushangi Goginava, Leri Gogoladze

Co-chair: Ana Danelia

**Friday, September 18**

**(online, using Zoom system)**

**17:00 - 17:20 Vakhtang Kokilashvili**

Uniform convergence of double Vilenkin-Fourier series

**17:20 - 17:40 Larry Gogoladze, Giorgi Cagareishvili**

On the absolute convergence of general Fourier series

**17:40 - 18:00 Shakro Tetunashvili, Tengiz Tetunashvili**

On the uniqueness of multiple function series

**18:00 - 18:20 Ushangi Goginava, Giorgi Oniani**

On the divergence of subsequence of partial Walsh-Fourier sums

**18:20 - 18:40 Alexander Meskhi**

Boundedness criteria for maximal and singular integral operators in weighted grand Morey spaces

**18:40 - 19:00 Rusudan Meskhia**

Fourier trigonometric series with gaps

**19:00 - 19:20 Giorgi Imerlishvili, Alexander Meskhi**

The weight estimates for one-sided multilinear fractional integrals

# Section of Complex Analysis and Applications

Chair: Grigor Giorgadze

Co-chair: George Akhalaia

## Thursday, September 17

(online, using Zoom system)

- 14:00 - 14:20** Lasha Ephremidze, Ilya Spitkovsky (United Arab Emirates)  
On explicit Wiener-Hopf factorization Of certain class of 2x2 matrix functions
- 14:20 - 14:40** **Grigori Giorgadze.**  
Riemann-Hilbert boundary value problem with a piecewise constant transition function
- 14:40 - 15:00** **Gega Gulagashvili**  
On the splitting type of vector bundles on the Riemann sphere induced from second order fuchsian system
- 15:00 - 15:20** **George Kakulashvili**  
Computation of exterior moduli by power series
- 15:20 - 15:40** **Vagner Jikia**  
On some properties of Euler integrals
- 15:40 - 16:00** **Valerian Jiqia**  
On the special case of the boundary value problem for Carleman-Bers-Vekua equation
- 16:00 - 16:20** Giorgi Akhalaia, Nino Manjavidze  
Boundary value problem for the first order elliptic systems in the plane

## Friday, September 18

(online, using Zoom system)

- 20:00 - 20:20** **Vakhtang Kokilashvili**  
Boundary value problems for analytic and generalized analytic functions in the framework of grand Lebesgue spaces
- 20:20 - 20:40** **George Makatsaria**  
Some properties of the solutions space of irregular elliptic systems
- 20:40 - 21:00** **Giorgi Khimshiashvili**  
On area foliation in spaces of triangles
- 21:00 - 21:20** **Nugzar Makhaldiani (Russia)**  
Renormdynamics of space dimension and quarkonia potentials



# Section of Ordinary Differential Equations and Optimal Control

Chairs: Roman Koplataдзе, Tamaz Tadumadze  
Co-chair: Tea Shavadze

**Thursday, September 17**  
**(online, using Zoom system)**

**17:00 - 17:20** **Lela Alkhazishvili, Medea Iordanishvili**

The variation formula of solution for the linear controlled differential equation considering the mixed initial condition and perturbation of delays

**17:20 - 17:40** **Malkhaz Ashordia, Nato Kharshiladze**

On the solvability of the modified Cauchy problem for linear impulsive differential systems with singularities

**17:40 - 18:00** **Nino Burjanadze, Salome Chachanidze**

On the existence of solutions of some classes neutral and delay two-stage optimal problems

**18:00 - 18:20** **Akaki Gabelaia**

Problem of predicting the spread of Coronavirus (covid-19)

**18:20 - 18:40** **Tamaz Tadumadze**

On the existence of solutions of some classes of two-stage extremal problems

**18:40 - 19:00** **Roman Koplataдзе**

Integral conditions for oscillation of n-th order linear ordinary differential equations with several delayed argument

**19:00 - 19:20** **Abdeljalil Nachaoui (France), Tea Shavadze**

On the local representation of solution of one class of perturbed controlled differential equation with delay and the discontinuous initial condition

**19:20 - 19:40** **Natia Khachidze**

Necessary conditions for existence of positive solutions and sufficient conditions for oscillation of solutions of the almost linear difference equations of second order

# Section of Partial Differential Equations

Chairs: Temur Jangveladze, Sergo Kharibegashvili, David Natroshvili

Co-chair: Zurab Kiguradze

**Friday, September 18**

**(online, using Zoom system)**

**15:00 - 15:20 Sveta Gorgisheli, Maia Mrevlishvili, David Natroshvili**

Localized boundary-domain integro-differential equations approach

**15:20 - 15:40 **Tamaz Vashakmadze****

On the theory and practice of thin walled structures

**15:40 - 16:00 Mamuli Zakradze, Murman Kublashvili**

On some aspects of solving boundary problems by the method of conformal mapping

**16:00 - 16:20 **David Natroshvili****

Mixed boundary-transmission problems for composite layered elastic structures containing interfacial cracks

**16:20 - 16:40 Mariam Rashoian, Irine Sigua**

Boundary value problems for a class of linear homogeneous first-order hyperbolic systems

**16:40 - 17:00 Jemal Rogava, Mikheil Tsiklauri**

On the convergence of an iterative method for one non-linear operator equation

**17:00 - 17:20 **Temur Jangveladze****

Investigation and approximate solution of the nonlinear integro-differential equation of diffusion type

# Section of Theory of Probability and Mathematical Statistics

Chairs: Elizbar Nadaraia, Omar Purtukhia

**Thursday, September 17**  
**(online, using Zoom system)**

- 15:00 - 15:20** **Petre Babilua, Elizbar Nadaraya, MzevinarPatsatsia**  
On estimating the Bernoulli regression function using Bernstein polynomials
- 15:20 - 15:40** **Kachiashvili Kartlos**  
Identification of regression dependences at passive and active experiments
- 15:40 - 16:00** **Malkhaz Shashiashvili**  
Representation of the snell envelope as the future supremum process
- 16:00 - 16:20** **Besik Chikvinidze**  
An extension of Jacod's condition
- 16:20 - 16:40** **Luka Tikanadze**  
On Jensen's functional equation
- Break**
- 17:00 - 17:20** **Beqnu Pharjiani, Tsiala Kvatadze, Zurab Kvatadze**  
On the single application of estimation constructed of chain dependent samples of density
- 17:20 - 17:40** **Tristan Buadze, Vazha Giorgadze**  
Some issues on statistical assessment
- 17:40 - 18:00** **Alexander Tkeshelashvili**  
A remark on characteristic functionals for Random Functions of sets
- 18:00 - 18:20** **Sandro Davadze, Maya Giorgadze, Omar Purtukhia**  
Stochastic integral representation of some Brownian functional with explicit expression of integrand

# Section of Mechanics of Continua

Chairs: Tengiz Meunargia, George Jaiani

Co-chair: Natalia Chinchaladze

## Thursday, September 17

(online, using Zoom system)

**16:00 - 16:20** Gia Avalishvili, **Mariam Avalishvili**

On dynamic hierarchical models of thermo-electro-magneto-elastic bars

**16:20 - 16:40** **Lamara Bitsadze**

The BVPs for transversely isotropic half-plane with double porosity

**16:40 - 17:00** **Salome Bitsadze**

Study of the basic boundary value problems of statics of the theory of thermoelasticity by the potential method

**17:00 - 17:20** Bakur Gulua, **Tengiz Meunargia**

The solution of some problems of the theory of thermoelasticity with microtemperatures for a circular ring

**17:20 - 17:40** **Davit Gurgenidze**, Gela Kipiani, **Gocha Badzgaradze**

Analysis on stability of having holes and cuts thin-walled spatial structures

**17:40 - 18:00** **Natela Zirakashvili**

Analytical solution of some boundary value problems for hyperbolic cylinders

## Friday, September 18

(online, using Zoom system)

**12:00 - 12:20** **Tinatin Kapanadze**

Study of the basic boundary value problems of stationary oscillations of the theory of thermoelasticity by the potential method

**12:20 - 12:40** **Takevarashvili Archili**

On static and dynamical problems for piezoelectric elastic infinite layer

**12:40 - 13:00** **Kosta Svanadze**

Effective solution of the one nonlocal problem of statics of the theory of elastic mixture in a circular domain

**13:00- 13:20** **Luiza Shapakidze**

Effect of the prandtl number on the instability and transitions of a nonisothermal flow between horizontal cylinders

**13:20 - 13:40** **Ivane Tsagareli**

Solution of the problems of quasi-statics for an circle with double porosity

**13:40 - 14:00** **George Jaiani**

N-th approximation of hierarchical models for Kelvin-Voigt plates with variable thickness

**14:00 - 14:20** **Natalia Chinchaladze**

On some tension-compression dynamical problems in the zero approximation of hierarchical models for Kelvin-Voigt plates with variable thickness

**14:20 - 14:40** **Tsiala Jamaspishvili**, Nugzar Shavlakadze

The boundary and boundary-contact problems for a piecewise homogeneous viscoelastic plate

**14:40 - 15:00** **Roman Janjgava**

On the elastic equilibrium of porous plates with voids

# Section of Mathematical Modeling and Numerical Analysis

Chairs: Teimuraz Davitashvili, Jemal Rogava, Tamaz Vashakmadze

Co-chair: Archil Papukashvili

**Friday, September 18**

**(online, using Zoom system)**

**12:00 - 12:20 Tamaz Vashakmadze**

On the realization of Gauss-Hermite processes

**12:20 - 12:40 Archil Prangishvili, Tamaz Obgadze, Naida Kuloshvili**

On the realization by Gauss-Hermite approximate method for Cauchy problem

**12:40 - 13:00 Temur Chilachava, Giorgi Pochkhua, Sulava Leila, Chakaberia Maia**

Mathematical and computer modeling of political conflicts in the case of variable coefficients

**13:00 - 13:20 Teimuraz Davitashvili**

Modelling of the Caucasus glacier transformation based on one simple model

**13:20 - 13:40 Archil Papukashvili, Giorgi Papukashvili, Meri Sharikadze**

On the numerical computations of an antiplane problem in the case of isotropic composite body weakened by a crack

**13:40 - 14:00 Khatuna Elbakidze, Luca Sorrison-Valvo (Italy)**

Properties of energy transfer processes in space plasma turbulence

**14:00 - 14:20 Nino Khatiashvili**

On 2d free boundary problem for the Stokes flow

**14:20 - 14:40 Nikoloz Kachakhidze, Jemal Peradze, Zviad Tsiklauri**

On realization of a numerical algorithm for a Timoshenko nonlinear beam system

**14:40 - 15:00 Zurab Vashakidze**

Design and computer implementation of a three-layer symmetrical semi-discrete scheme for the non-linear dynamical Kirchhoff string equation