

**XXXI International Enlarged Sessions of the Seminar
of Ilia Vekua Institute of Applied Mathematics (VIAM)
of Ivane Javakhisvili Tbilisi State University (TSU)
Dedicated to the 110th Birthday Anniversary of Academician Ilia Vekua**

April 19–21, 2017

Program



**Opening - April 19, Wednesday, 14:00
Ilia Vekua Lecture Hall in VIAM**

Organizing Committee

George Jaiani (Chair)
Nikoloz Avazashvili (Co-Chair)
Temur Jangveladze (Co-Chair)
Mikheil Rukhaia (Scientific Secretary)
Zurab Kiguradze (Contact Person, email: zkigur@yahoo.com)
Mariam Beriashvili
Natalia Chinchaladze
Besik Dundua
Miranda Gabelaia
Bakur Gulua
Zurab Vashakidze

In the case of co-authors the speaker's name is underlined.

The peer-reviewed manuscripts will be published. The source tex and the corresponding pdf files of the English version of the talk, prepared using the template (information how to prepare an article, together with a LaTeX template is available for download from http://www.viam.science.tsu.ge/en_ses.htm) and not exceeding four A4-format pages should be uploaded in the system

<http://www.viam.science.tsu.ge/userspace/login>

before May 31, 2017.

Opening of the Seminar will start on April 19, 2017 at 14:00 at I. Vekua Institute of Applied Mathematics (University str. 2, 0186 Tbilisi, Georgia).

As usual on April 23 at 16:00 a visit to Mtatsminda Pantheon is planned, where Ilia Vekua is buried.

Wednesday, April 19
Ilia Vekua Lecture Hall (VIAM)

- 14:00 **Opening**
Professor George Sharvashidze (Rector of Ivane Javakishvili Tbilisi State University)
Professor Mikhail Chkhenkeli (Vice-Rector of Ivane Javakishvili Tbilisi State University)
- 14:20 – 14:40 **George Jaiani.** Life and Activities of Ilia Vekua
- 14:45 – 15:00 **Coffee Break**

Section of Students Applying for TICMI Prize

- 15:00 – 15:20 **Lasha Baramidze.** Uniform convergence of double Vilenkin-Fourier series
- 15:25 – 15:45 **Giorgi Kupunia.** About asymptotic behavior of solutions of second order nonlinear difference equation
- 15:50 – 16:10 **Tea Shavadze.** Variation formulas of solutions for controlled functional-differential equations with several delays and the continuous initial condition

Section of Mathematical Logic and Foundations

Dedicated to the Memory of Professor Gogi Pantsulaia

Chairs: Alexander Kharazishvili, Roland Omanadze

Co-chair: Archil Kipiani

Wednesday, April 19

Room № 115 (VIAM)

- 10:00 – 10:20** Archil Kipiani. Universal graph for some class of groups
- 10:25 – 10:45** Revaz Grigolia, Antonio Di Nola (Italy), Giacomo Lenzi (Italy). Duality, projectivity and unification in locally finite varieties of monadic MV-algebras
- 10:50 – 11:10** Ryszard Frankiewicz (Poland), Joanna Jureczko (Poland). On solutions of Kuratowski problem 1
- 11:15 – 11:35** Ryszard Frankiewicz (Poland), Joanna Jureczko (Poland). On solutions of Kuratowski problem 2
- 11:40 – 12:00** Tengiz Tetunashvili. On finite independent families of convex bodies in R^2 and R^3 spaces.
- 12:05 – 12:25** Tamar Kasrashvili, Aleksi Kirtadze. On some estimates of topological weights of left-invariant measures on uncountable solvable groups
- 12:30 – 12:50** Mariam Beriashvili. Projective nonmeasurable sets

Section of Applied Logics and Programming

Chair: Matthias Baaz (Austria)

Co-chairs: Jemal Antidze, Khimur Rukhaia

Wednesday, April 19

Room № 226 (VIAM)

- 10:00 – 10:20** **Mikheil Rukhaia.** Cut-elimination in calculus of structures
- 10:25 – 10:45** **Anriette Bishara** (Egypt). Description logic and its species
- 10:50 – 11:10** **Nodar Momtselidze.** Spark - big data analytics
- 11:15 – 11:35** **Besik Dundua.** Higher order term rewriting with regular types
- 11:40 – 12:00** **Lia Kurtanidze.** The using of information technology in the teaching process
- 12:05 – 12:25** **Nugzar Iashvili.** Construction issues of mathematical model of analytical measuring device
- 12:30 – 12:50** **Khimuri Rukhaia, Lali Tibua, Sopho Pkhakadze.** Invariance and monotonicity property of unranked operators

Section of Number Theory, Algebra and Geometry

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

Wednesday, April 19

Room № 108 (XI Building of TSU)

- 10:00 – 10:20** **Mikheil Amaglobeli.** Basic groups operations on exponential MR-groups
- 10:25 – 10:45** **Teimuraz Vepkhvadze.** The number of representation of numbers by positive binary quadratic forms with even discriminant
- 10:50 – 11:10** **Ketevan Shavgulidze.** On the spaces of spherical polynomials and generalized theta-series with quadratic forms of five variables
- 11:15 – 11:35** **Ilia Tavkhelidze.** One method of analytic representation and classification of a wide set of geometric figures with "complex" configuration and their movements
- 11:40 – 12:00** **Vakhtang Lomadze.** Converting high order linear partial differential equations to first order
- 12:05 – 12:25** **Tengiz Bokelavadze.** The W-completion of a torsion-free group

Section of Real Analysis

Chairs: Ushangi Goginava, Leri Gogoladze

Co-chair: Ana Danelia

Thursday, April 20

Room № 332 (XI Building of TSU)

- 15:00 – 15:20** **Larry Gogoladze.** On the unconditional convergence of general Fourier series
- 15:25 – 15:45** **Shakro Tetunashvili.** On universal function series
- 15:50 – 16:10** **Vakhtang Tsagareishvili.** General orthonormal system and absolute convergence of Fourier series
- 16:15 – 16:35** **Teimuraz Akhobadze, Shalva Zviadadze.** A generalized Salem test for multivariable functions
- 16:40 – 17:00** **Omar Dzagnidze.** One dimensional Fourier series of functions of many variables
- 17:05 – 17:25** **Ushangi Goginava.** Norm convergence of logarithmic means on unbounded Vilenkin group
- 17:30 – 17:50** **George Chelidze, George Giorgobiani, Vaja Tarieladze.** Rearrangement theorem for the weak topology
- 17:55 – 18:15** **Rusudan Meskhia.** Generalized absolute convergence of Fourier series
- 18:20 – 18:40** **Nino Rusiashvili.** On the method of surjective homomorphisms in the theory of invariance measures
- 18:45 – 19:05** **Ekaterine Vekua.** The analogue of Paley theorem for multiple trigonometric Fourier series
- 19:10 – 19:30** **Givi Nadibaidze.** Cesaro strong summability of series with respect to block-orthonormal system

Section of Complex Analysis and Applications

Chair: Grigor Giorgadze

Co-chair: George Akhalaia

Thursday, April 20

Ilia Vekua Lecture Hall (VIAM)

- 11:00 – 11:20** **George Akhalaia, Nino Manjavidze.** Differential boundary value problem for the second order linear elliptic system of differential equations on the plane
- 11:25 – 11:45** **Valerian Jikia.** Unusual cases of linear conjugation problem for the Carleman-Vekua equation
- 11:50 – 12:10** **George Makatsaria, Ia Ramishvili, Tamaz Vekua.** The Liouville type theorems for the first order two-dimensional singular differential systems
- 12:15 – 12:35** **Nugzar Makhaldiani.** Supersymmetric dynamics and quantum computers
- 12:40 – 13:00** **Vakhtang Paataashvili.** Dirichlet problem in Smirnov classes of harmonic functions
- 13:00 – 13:15** **Coffee Break**
- 14:00 – 14:20** **Tinatin Supatashvili.** Super symmetry and pseudoanalytic functions
- 14:25 – 14:45** **Nika Kochkiani.** Super symmetric Jaynes-Cummings Hamiltonian
- 14:50 – 15:10** **Goga Suknidze.** Factorization of the two dimensional Schrödinger equations and Darboux transformation
- 15:15 – 15:35** **Gega Gulagashvili.** On the splitting type of the two rank vector bundles on the Riemann sphere
- 15:40 – 16:00** **Grigor Giorgadze.** Quasiconformal instanton and vortex equations on the Riemann sphere
- 16:05 – 16:25** **Ilia Lomidze.** The Legendre function of the second kind. New relation
- 16:30 – 16:50** **Natela Chachava.** Symbolic estimation of distances between real and imaginary parts of the polynomial's roots
- 16:55 – 17:15** **Vagner Sh. Jikia.** New properties of the Euler function and applications

Section of Ordinary Differential Equations and Optimal Control

Dedicated to the 90th Birthday of Academician Revaz Gamkrelidze

Chairs: Roman Koplataдзе, Tamaz Tadumadze

Friday, April 21

Room № 256 (VIAM)

- 09:00 – 09:20** **Tamaz Tadumadze.** Variation formulas of solutions for functional differential equations considering perturbations of several delays and the discontinuous initial condition and their applications in optimal control problems
- 09:25 – 09:45** **Phridon Dvalishvili, Lela Alkhazishvili, Medea Iordanishvili.** On the well-posedness of the Cauchy problem for nonlinear functional differential equations with concentrated and distributed variable delays
- 09:50 – 10:10** **Bezhan Gvaberidze, Bidzina Matsaberidze.** On a method of solving be-criteria partitioning and covering problems
- 10:15 – 10:35** **Akaki Gabelaia.** Linear autonomous systems stabilization with incomplete information on the bases of MatLab
- 10:40 – 11:00** **Tea Shavadze.** On estimation of the increment of solution for one class of controlled functional differential equation with several delays and the discontinuous initial condition
- 11:05 – 11:25** **Natia Khachidze.** Asymptotic behavior of solutions of high order difference equation with deviated argument
- 11:30 – 11:50** **Nika Gorgodze, Ia Ramishvili.** On the well-posedness of the Cauchy problem for one class of neutral quasi-linear functional differential equation
- 11:55 – 12:15** **Roman Koplataдзе.** On asymptotic behavior of solutions of first order difference equation

Section of Partial Differential Equations

Chairs: Temur Jangveladze, Sergo Kharibegashvili, David Natroshvili

Co-chair: Zurab Kiguradze

Wednesday, April 19

Room № 227 (VIAM)

- 10:00 – 10:20** **Zurab Kiguradze, Maia Kratsashvili**. Finite difference scheme for one system of nonlinear partial integro-differential equations with source terms
- 10:25 – 10:45** **Mikheil Gagoshidze**. On the numerical solution of one nonlinear integro-differential system with source terms
- 10:50 – 11:10** **Ciala Kacadze**. On the numerical solution of one-dimensional analog of Mitchison nonlinear partial differential system
- 11:15 – 11:35** **Besiki Tabatadze**. On the numerical solution of two-dimensional Mitchison nonlinear model
- 11:40 – 12:00** **Giorgi Tsulaia**. On the stationary solution and numerical approximation for one-dimensional Maxwell system
- 12:05 – 12:25** **Temur Jangveladze**. Well-posedness and approximate solution of the initial-boundary value problem for nonlinear integro-differential equation obtained by the reduction of Maxwell system

Thursday, April 20

Room № 227 (VIAM)

- 10:00 – 10:20** **Dazmir Shulaia, Tamaz Vekua**. Solution of one integral equation from multivelocity transport theory
- 10:25 – 10:45** **Giorgi Devdariani**. On a cusped shell
- 10:50 – 11:10** **Diana Ivanidze, Marekh Ivanidze**. The basic transmission problem of statics
- 11:15 – 11:35** **Solomon Kurtanidze**. On one redundant system and its numerical solution
- 11:40 – 12:00** **Giorgi Dekanoidze**. On the global solvability of the first Darboux problem for one class of nonlinear second order hyperbolic systems

Friday, April 21

Ilia Vekua Lecture Hall (VIAM)

- 10:00 – 10:20** **Seyran Abelyan, Armenak Babayan (Armenia)**. On a Dirichlet problem for one sixth order elliptic equation
- 10:25 – 10:45** **Alexander Kozhanov (Russia)**. Conjugate problems for some classes of non-stationary differential equations with a variable direction of evolution
- 10:50 – 11:10** **Ludmila Pulkina (Russia)**. Nonlocal problems with integral conditions
- 11:15 – 11:35** **Otar Jokhadze, Sergo Kharibegashvili**. Mixed problem with nonlinear boundary conditions for semi-linear wave equation
- 11:40 – 12:00** **Maksim Kukushkin (Russia)**. Properties of strong accretively operators of fractional differentiation
- 12:05 – 12:25** **David Natroshvili**. Method of fundamental solutions for mixed and crack type problems in the classical theory of elasticity

Section of Theory of Probability and Mathematical Statistics

Chairs: Elizbar Nadaraia, Omar Purtukhia

Thursday, April 20

Room № 335 (XI Building of TSU)

- 14:20 – 14:40 **Malkhaz Shashiashvili.** Mathematical analysis of the optimal exercise boundary for the American option with time and level dependent volatility
- 14:45 – 15:05 **Badri Mamporia.** Stochastic differential equations in a Banach space, main directions and new method of development
- 15:10 – 15:30 **Vakhtang Kvatratskhelia, Kote Ninidze, George Chelidze.** On an algorithm of finding sign-invariant pairs of elements in normed spaces
- 15:35 – 15:55 **Besik Chikvinidze, Revaz Tevzadze.** Application of forward backward stochastic differential equation in optimization investment problem
- 16:00 – 16:15 **Break**
- 16:20 – 16:40 **Kartlos Kachiachvili.** Estimators of the parameters of beta distribution
- 16:45 – 17:05 **Omar Purtukhia, Vakhtang Jaoshvili.** Hedging of one European option of barrier type
- 17:10 – 17:30 **Besarion Dochviri, Zaza Khechinashvili.** On the multidimensional financial (B, S) market
- 17:35 – 17:55 **Luka Tikanadze.** About one construction of stochastic integral

Friday, April 21

Room № 335 (XI Building of TSU)

- 11:20 – 11:40 **Revaz Tevzadze, Mikheil Mania.** A system of forward-backward SDEs related to utility maximization problem
- 11:45 – 12:05 **Zurab Zerekidze, Omar Purtukhia.** The weakly consistent, strongly consistent and consistent estimates of the parameters
- 12:10 – 12:30 **Aleksandre Tkeshelashvili.** On weak distributions of measures in the infinite dimensional Hilbert space
- 12:35 – 12:55 **Petre Babilua, Elizbar Nadaraia.** On deviations between kernel type estimators of a distribution density in $p \geq 2$ independent samples

Section of Mechanics of Continua

Dedicated to the 80th Birthday of Professor Tengiz Meunargia

Chairs: Tengiz Meunargia, George Jaiani

Co-chair: Natalia Chinchaladze

Thursday, April 20

Room № 118 (VIAM)

- 13:20 – 13:40** **David Pataraiia, Edisher Tsotseria, Rusudan Maisuradze.** analysis and design of having extreme parameters rope lowering system (ZIPLINE) with application of rope discrete model
- 13:45 – 14:05** **Bakur Gulua.** Basic boundary value problems for a circle with double porosity
- 14:10 – 14:30** **Roman Janjgava.** On a plane boundary value problem of the Cosserat theory for a perforated domain
- 14:35 – 14:55** **Nino Gulua.** Thermoelastic equilibrium of a cylinder in the elliptic cylindrical coordinate system

Friday, April 21

Room № 115 (VIAM)

- 11:00 – 11:20** **Tengiz Meunargia.** Closed convex shells
- 11:25 – 11:45** **Lamara Bitsadze.** Effective solution of some BVP of the linear theory of thermoelasticity with microtemperatures
- 11:50 – 12:10** **Giorgi Kapanadze.** The problem of finding an equally strong contour for a rectangular plate weakened by a rectilinear cut, whose ends are cut out by convex smooth arcs
- 12:15 – 12:35** **Ivane Tsagareli.** Solving boundary problems of elastostatics for a porous circle
- 12:40 – 13:00** **Natela Zirakashvili.** Obtaining numerical-analytical solutions of the contact problems of elasticity for some distributed loads
- 13:05-13:25** **Gia Avalishvili, Mariam Avalishvili.** On investigation of static three-dimensional model of thermoelastic piezoelectric bodies

Section of Mathematical Modelling and Numerical Analysis

Dedicated to the 80th Birthday of Professor Tamaz Vashakmadze

Chairs: Teimuraz Davitashvili, Jemal Rogava, Tamaz Vashakmadze

Co-chair: Archil Papukashvili

Thursday, April 20

Room № 115 (VIAM)

- 11:00-11:20 **Tamaz Vashakmadze.** From Chladni to Gödel or on the example of realizing the laws of the unity and conflict of opposites and of the negation of the negation
- 11:25-11:45 **Ramaz Botchorishvili.** Inverse modelling of matrix eigenvalue problem using system of ordinary differential equations
- 11:50-12:10 **Ramaz Botchorishvili, Nino Bukuri.** Adaptive multischeme refinement for linear advection equation on Cartesian meshes in two space dimensions
- 12:15-12:35 **Tinatini Davitashvili, Hamlet Meladze.** About one algorithm of solving non-local contact problem for parabolic equations
- 12:40-13:00 **Archil Papukashvili, Zurab Vashakidze, Meri Sharikadze.** On one method of approximate solution of Kirchhoff type static beam nonlinear integro-differential equation
- 13:00-13:15 Coffee Break
- 13:20-13:40 **Guram Gabrichidze.** Natural disasters modeling urgent tasks in Georgia
- 13:45-14:05 **Kakhaber Odisharia, V. Odisharia, P. Tsereteli, N. Janikashvili,** Implementation of the mathematical model of rheumatoid arthritis
- 14:10-14:30 **Jemal Rogava, Nana Dikhaminjia, Mikheil Tsiklauri** High order accuracy decomposition scheme for abstract hyperbolic equation
- 14:35-14:55 **Giorgi Papukashvili.** A numerical algorithm for a Timoshenko type beam nonlinear integro-differential equation
- 15:00-15:20 **Giorgi Geladze.** Numerical simulation of some atmospheric humidity processes
- 15:25-15:45 **Khatuna Chargazia.** The large-scale ULF electromagnetic structures in the ionosphere with shear flow
- 15:50-16:10 **Bakur Gulua, Roman Janjgava.** Boundary value problems of the theory of elasticity of porous Cosserat media for solids with triple-porosity
- 16:15-16:35 **Teimuraz Davitashvili.** Modelling of gas conveyance in pipe network
- 16:40-17:00 **Nino Khatiashvili.** On the gravity waves in incompressible fluid
- 17:05 –17:25 **Zviad Kalichava, Jemal Peradze.** Approximation with respect to the spatial variable of the solution of a nonlinear beam equation