

# International Workshop on the Qualitative Theory of Differential Equations

## QUALITDE – 2021

*Dedicated to the 130th birthday anniversary of Academician N. Muskhelishvili*

December 18 – 20, 2021, Tbilisi, Georgia

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*A. Razmadze Mathematical Institute of I. Javakhishvili Tbilisi State University  
6 Tamarashvili Str., Tbilisi 0186, Georgia*

## Program

December 18, 2021

- 11:45 – 12:00** **Opening of the Workshop**
- 12:00 – 12:30** **I. Kiguradze** – Optimal Conditions for the Unique Solvability of Two-Point Boundary Value Problems for Third Order Linear Singular Differential Equations
- 12:30 – 13:00** **M. Ashordia** – On the Well-Posedness Question of the Cauchy Problem with Weight for Systems of Linear Generalized Ordinary Differential Equations and Impulsive Equations with Singularities
- 13:00 – 13:30** **O. Jokhadze** – On the Inequality of Characteristics in the Statement of the First Darboux Problem for Second Order Hyperbolic Systems with Non-Split Principal Parts
- 13:30 – 14:00** **I. Kiguradze, N. Partsvania** – Second Order Nonoscillatory Singular Linear Differential Equations
- 14:00 – 14:30** **M. Manjikashvili** – Disconjugacy and Green's Functions Sign for Some Two-Point Boundary Value Problems for Fourth Order Ordinary Differential Equations
- 14:30 – 15:00** **Break**
- 15:00 – 17:30** **Overview of the talks of participants in absentia**
- P. Omari, E. Sovrano** – Sign-indefinite Logistic Models with Flux-Saturated Diffusion: Existence and Multiplicity Results
- J. Jaroš, T. Kusano, T. Tanigawa** – Oscillatory Properties of Solutions of Second Order Half-Linear Differential Equations
- C. Wang, R. P. Agarwal** – The Exponential Solution to Quaternion Dynamic Equations Based on a New Quaternion Hyper-Complex Space with Hyper Argument
- J. Šremr** – On Stability and Asymptotic Properties of Solutions of Second-Order Damped Linear Differential Equations with Periodic Non-Constant Coefficients
- V. Mikhailets, T. Skorobohach** – On Solvability of Inhomogeneous Boundary-Value Problems in Fractional Sobolev Spaces
- E. Bravyi** – On the Solvability of a Three Point Boundary Value Problem for First Order Linear Functional Differential Equations
- M. Bartušek, Z. Došlá, M. Marini** – Oscillation Problems for Generalized Emden--Fowler Equation
- S. Stan k** – Boundary Value Problems for Implicit Fractional Differential Equations at Resonance
- A. Rontó, M. Rontó, I. Varga** – On Non-Linear Boundary Value Problems for Iterative Differential Equations

**R. Hakl, J. Oyarce** – Positive Solutions to Boundary Value Problems for Nonlinear Functional Differential Equations

**R. I. Kadiev, A. Ponosov** – Stability of Solutions of Semidiscrete Stochastic Systems Using N. V. Azbelev's  $W$ -Method

**T. Kiguradze, R. Alhuzally** – On a Dirichlet Type Boundary Value Problem in an Orthogonally Convex Cylinder for a Class of Linear Partial Differential Equations

**Z. Kiguradze** – Gaussian Process for Heat Equation Numerical Solution

**V. P. Maksimov** – On an Interpolation Boundary Value Problem

**S. Mukhigulashvili** – Necessary and Sufficient Conditions of Disconjugacy for Fourth Order Linear Ordinary Differential Equations

**A. T. Assanova** – A Problem for a Family of Partial Integro-Differential Equations with Weakly Singular Kernels

### December 19, 2021

**11:00 – 11:30** **G. Berikelashvili, N. Kachakhidze** – Sixth Order Accuracy Difference Schemes for the Helmholtz-Type Equation

**11:30 – 12:00** **T. Jangveladze** – On One System of Nonlinear Degenerate Integro-Differential Equations of Parabolic Type

**12:00 – 12:30** **S. Kharibegashvili** – The Boundary Value Problem for a Semilinear Hyperbolic System

**12:30 – 13:00** **T. Shavadze, T. Tadumadze** – On the Representation of a Solution for the Perturbed Controlled Differential Equation with the Discontinuous Initial Condition Considering Perturbation of the Initial Moment

**13:00 – 13:30** **T. Tadumadze** – On the Existence of an Optimal Element in Control Problems with Several Constant Delays

**13:30 – 14:00** **Break**

**14:00 – 16:30** **Overview of the talks of participants in absentia**

**N. A. Izobov, A. V. Il'in** – Anti-Perron's Effect of Changing Linear Exponentially Decreasing Perturbations of All Positive Characteristic Exponents of the First Linear Approximation to Negative Ones

**I. N. Sergeev** – Investigation of the Oscillation, Rotation and Wandering Radial Indicators of a Differential System by the First Approximation

**E. K. Makarov** – On  $k$ -Point Approximations for the Izobov Sigma-Exponent

**E. A. Barabanov, V. V. Bykov** – Description of the Perron Exponent of a Linear Differential System with Unbounded Coefficients as a Function

**A. Ravcheev** – Description of the Linear Perron Effect Under Parametric Perturbations of a System with Unbounded Coefficients

**A. N. Vetokhin** – The Exact Baire Class of the Asymptotic  $v$ -Capacity of a Family of Non-Autonomous Dynamical Systems Continuously Depending on a Parameter

**O. Kichmarenko, O. Kapustian, N. Kasimova, T. Zhuk** – Approximate Solution of Optimal Control Problem for Differential Inclusion with Fast-Oscillating Coefficients on Semi-Axis

**A. K. Demenchuk** – A Condition for the Solvability of the Control Problem of

Asynchronous Spectrum of Linear Almost Periodic Systems the Lower Triangular Representation of Mean Value of Coefficient Matrix

**A. S. Vaidzelevich** – Linear Differential Equations with the Hukuhara Derivative that Preserve Sets of Constant Width

**A. A. Bondarev** – Existence of a Complete Unstable Differential System with Perron and Upper-Limit Partial Stability

**A. Pranevich, A. Grin, E. Musafirov, F. Munteanu, C. Sterbeti** – Conditional Partial Integrals of Polynomial Hamiltonian Systems

## December 20, 2021

### 11:00 – 13:30 Overview of the talks of participants in absentia

**M. Perestyuk, O. Kapustyan, T. Yusypiv, S. Dashkovskiy** – Robust Stability of Global Attractors for Reaction-Diffusion System w.r.t. Disturbances

**I. V. Astashova** – Remark on Continuous Dependence of Solutions to the Riccati Equation on its Right-Hand Side

**V. M. Evtukhov, N. V. Sharay** – Asymptotic Behaviour of Solutions of Third-Order Differential Equations with Rapid Varying Nonlinearities

**A. Stanzhytskyi, O. Stanzhytskyi, T. Koval'chuk, R. Uteshova** – Weak Solutions for Coupled Stochastic Functional-Differential Equations in Infinite-Dimensional Spaces

**S. Chuiko, A. Chuiko, V. Kuzmina** – Boundary Value Problems for Systems of Singular Integral-Differential Equations of Fredholm Type with Degenerate Kernel

**S. Chuiko, E. Chuiko, K. Shevtsova** – Linear Differential-Algebraic Boundary Value Problem with Pulse Influence

**S. Chuiko, Ya. Kalinichenko** – About the Reduction of the Linear Noetherian Difference Algebraic Boundary Value Problem to the Noncritical Case

**S. A. Shchogolev, V. V. Karapetrov** – On the Critical Case in the Theory of the Matrix Differential Equations

**O. Nesmelova** – Matrix Boundary-Value Problems for Differential Equations with  $p$ -Laplacian

**O. O. Chepok** – The Asymptotic Properties of  $P_S(Y_0, Y_1, \dots)_0$ -solutions of Second Order Differential Equations with the Product of a Regularly Varying Function of Unknown Function and a Rapidly Varying Function of its First Derivative

**S. Ezhak, M. Telnova** – On Some Estimates for the First Eigenvalue of a Sturm-Liouville Problem

**O. Karpenko, V. Mogylova** – About the Relation Between Qualitative Properties of the Solutions of Differential Equations and Equations on Time Scales

**T. Korchemkina** – On The Behavior of Solutions to Third Order Differential Equations with General Power-Law Nonlinearities and Positive Potentia

**A. A. Stekhun** – Asymptotic Behaviour of Special Types of Solutions of Third Order Differential Equations, Asymptotically Close to Linear

**V. Sobchuk, I. Zelenska** – Cauchy's Problem for Singular Perturbed Systems of Differential Equations with Nonstable First-Order Turning Point