

Preliminary conference program

(in Moscow time)

Zoom links for online meetings

To have part in conference meeting online, proceed links below:

The first stream:

<https://us02web.zoom.us/j/87635348013?pwd=NVNhNHh4ZzZlEL0NYaWswXI6S3BkQT09>

Meeting ID 876 3534 8013

pass-code 628333

The second stream:

<https://us06web.zoom.us/j/86703684273?pwd=CcGR9fPWISf0g8SUDMNk0DRfBael2.1>

Meeting ID 867 0368 4273

pass-code 456860

The third stream:

<https://us06web.zoom.us/j/88340582910?pwd=naHhy0M7kRYgVLTdvsMY1MrQINawty.1>

Meeting ID 883 4058 2910

pass-code 568920

Monday, December 4

10:20-10:30: Welcome (the first stream)

Plenary Session (the first stream)

Chair: A. Hasanoglu

10:30-11:05: **I.A. Taimanov** (Sobolev Institute of Mathematics; Novosibirsk, Russia)

Bloch function on non-simply-connected manifolds

11:05-11:40: **S.I. Kabanikhin** (Novosibirsk State University, Russia)

Regularization - from linear algebra to neural network

11:40-12:15: **Yu.V. Vassilevski** (Marchuk Institute of Numerical Mathematics RAS, Sirius University, Sechenov University, Russia), **Ovsepyan** (Sirius University, Russia); **V. Salamatova** (Sechenov University, Sirius University, Russia); **A. Liogky** (INM RAS, Sechenov University, Sirius University, Russia)

How experimental studies and data-driven constitutive modeling can help in the aortic valve neocuspidization

Coffee break

12:25-13:00: **V.G. Romanov** (Sobolev Institute of Mathematics; Novosibirsk, Russia)

Inverse problems for some nonlinear equations

13:00-13:35: **W. Lionheart** (University of Manchester, UK)

Rich tomography: strain and texture

13:35-14:10: **A.E. Mironov** (Sobolev Institute of Mathematics; Novosibirsk, Russia)

Rank one commuting ordinary differential operators as a limit of commuting difference operators

14:10: Lunch

Session «Inverse problems and tomography» (the first stream)

Chairs: V. Krishnan, L.N. Pestov

14:35-15:00: **A.S.Mikhaylov** (St. Petersburg Department of Steklov Mathematical Institute, Russia),

V.S.Mikhaylov (St. Petersburg Department of Steklov Mathematical Institute, Russia)

On the Boundary Control method in discrete and continuous cases and related issues

15:00-15:25: **D.V.Korikov** (St. Petersburg Department of Steklov Mathematical Institute, Russia),

M.I. Belishev (St. Petersburg Department of Steklov Mathematical Institute, Russia)

Stability of solutions of the two-dimensional EIT problem

15:25-15:50: **M. Isaev** (Monash University, Australia), R.G. Novikov (CMAP, École Polytechnique, France)

PSWF-Radon approach to super-resolution in Fourier analysis

15:50-16:15: **N.A. Vaytsel** (Novosibirsk State University, Russia), V. A.Sharafutdinov (Sobolev Institute of Mathematics, Russia)

The ray transform of symmetric tensor fields with incomplete projection data. Cormack-type inversion formula for the two-dimensional ray transform

16:15-16:40: **V.A. Sharafutdinov** (Sobolev Institute of Mathematics; Novosibirsk, Russia)

Killing tensor fields on a Riemannian 2-torus

Coffee break

16:50-17:15: **V. Krishnan** (TIFR Centre for Applicable Mathematics, India), G. Ambartsoumian (University of Texas at Arlington, USA); N. Singhal (TIFR Centre for Applicable Mathematics, India); D. Agrawal (TIFR Centre for Applicable Mathematics, India)

A simple range characterization for spherical mean transform of radial functions in odd dimensions and applications.

17:15-17:40: **A. Dileep** (Indian Institute of Space Science and Technology, India), A. Hasanoglu (Kocaeli University, Turkey); S. Kumaraswamy (Indian Institute of Space Science and Technology, India)

Determination of a spatial load in a damped Kirchhoff-Love plate equation

17:40-18:05: **M.A. Shishlenin** (Sobolev Institute of Mathematics; Novosibirsk, Russia), S.I.

Kabanikhin (Sobolev Institute of Mathematics, Russia); N. Novikov (Sobolev Institute of

Mathematics, Russia)

Inverse problems of acoustical tomography

18:05-18:30: **A.S. Shurup** (Lomonosov Moscow State University, Faculty of Physics, Schmidt Institute of Physics of the Earth RAS, Russia), D. Presnov (Schmidt Institute of Physics of the Earth, RAS, Russia); A. Sobisevich (Schmidt Institute of Physics of the Earth, RAS, Russia)

Passive seismoacoustic tomography of Hawaiian islands region

18:30-18:55: **K.V. Dmitriev** (Moscow State University, Russia)

The possibilities of designing acoustic metamaterials using the scattering coefficients of their individual elements

18:55-19:20: **D. Zotov** (Moscow State University, Russia)

Algorithm for correcting fields measured during acoustic tomography

Session « Optimization methods» (the second stream)

Chair: **A.V. Gasnikov**

15:00-15:25: **S.S. Ablaev** (Vernadsky Crimean Federal University, MIPT, Russia), F. Stonyakin (MIPT, Russia), M. Alkousa (MIPT, Russia), A. Gasnikov (MIPT, Russia)

Adaptive subgradient methods for mathematical programming problems with quasi-convex functions

15:25-15:50: **G.D. Akindinov** (MIPT, IITP RAS, Sobolev Institute of Mathematics, Russia), V. Matyukhin (MIPT, Russia), O. Krivorotko (NSU, Sobolev Institute of Mathematics, MIPT, Russia)

Numerical solution to an inverse problem for a hyperbolic heat equation with small parameter

15:50-16:15: **E. Borodich** (MIPT, Russia)

Examples of saddle problems with composite structure for which complexity separation plays a key role

16:15-16:40: **S. Chezhegov** (MIPT, Russia), A. Gasnikov (MIPT, Russia), A. Rogozin (MIPT, Russia)

On decentralized nonsmooth optimization

Coffee break

16:50-17:15: **A. Lobanov** (ISP RAS, MIPT, Russia)

Gradient-free algorithm for solving saddle point problem under overparameterization condition

17:15-17:40: **N.V. Pletnev** (MIPT, Russia)

Application of first-order optimization methods to solving the retrospective Cauchy problem for the three-dimensional heat equation

17:40-18:05: **O.S. Savchuk** (MIPT; V. I. Vernadsky Crimean Federal University, Russia), A. Titov (MIPT, Russia), A. Gasnikov (MIPT; HSE University; Institute for Information Transmission Problems RAS; Caucasus Mathematical Center, Russia), F. Stonyakin (MIPT; V. I. Vernadsky Crimean Federal University, Russia), M. Alkousa (MIPT; HSE University, Russia), R. Zabirova (MIPT, Russia)

Online optimization problems with functional constraints under relative Lipschitz continuity and relative strong convexity conditions

18:05-18:30: **S.M. Puchinin** (MIPT, Russia), F. Stonyakin (MIPT, Russia); M. Alkousa (MIPT, Russia)
Gradient-Type Method for Optimization Problems with Polyak-Lojasiewicz Condition: Relative Inexactness in Gradient and Adaptive Parameters Setting

Tuesday, December 5

Plenary Session (the first stream)

Chair: A.A. Shananin

9:30-10:05: **M.V. Klibanov** (University of North Carolina at Charlotte, United States)
Carleman estimates for mean field games

10:05-10:40: **B.L. Sharma** (Indian Institute of Technology, Kanpur, India)
On wave motion in lattices: few conundrums and some recent developments in discrete scattering

10:40-11:15: **V.V. Lychagin** (Institute of control science, Russia)
On normal forms of quasilinear differential operators

Coffee break

11:25-12:00: **A.G. Yagola** (Lomonosov Moscow State University, Physical Faculty, Russia)
Joint data processing of gravimetric and magnetometric data in geophysics

12:00-12:35: **G.A. Koshevoy** (Institute for Information Transmission Problems, Russia)
Continuous combinatorics

12:35-13:10: **R.G. Novikov** (CMAP, École Polytechnique, France; IEPT RAS, Russia)
A holographic uniqueness theorem

13:10: Lunch

Session «Mathematical methods of inverse problems and quasilinear equations» (the first stream)

Chairs: P.G. Grinevich, R.G. Novikov

14:00-14:25: **V.S. Dryuma** (Institute of Mathematics and Informatics of Republic Moldova, Moldova)
E. Cartan's normal projective connectivity and Riemann metrics associated with the system of Navier-Stokes equations

14:25-14:50: **O.S. Rozanova** (Lomonosov Moscow State University, Russia)
Euler-Poisson equations: singularities of solutions and regularizers

14:50-15:15: **L. Frumin** (Institute of Automation and Electrometry SB RAS, Russia), **A. Chernyavsky** (Institute of Automation and Electrometry SB RAS, Russia); **O. Belai** (Institute of Automation and Electrometry SB RAS, Russia)

Algorithms for solving the inverse scattering problem for the Manakov model

15:15- 15:40: **E. Tamci** (Izmir Institute of Technology, Turkey), **F. Savacı** (Izmir Institute of Technology, Turkey)

Inverse optimal control of stochastic swing equation driven by Levy process

Coffee break

15:50-16:15: **A.V. Faminskii** (RUDN, Russia)

Inverse problems for the higher order nonlinear Schrodinger equation

16:15-16:40: **L.A. Beklaryan** (Central Economics and Mathematics Institute RAS, Moscow Institute of Physics and Technology, Russia), **A.L. Beklaryan** (HSE University, Russia)

Dualism in the theory of soliton solutions

16:40-17:05: **A. Gorshkov** (Lomonosov Moscow State University, Russia)

Degenerate Fourier transforms and their applications to mathematical physics

17:05-17:30: **N. Saburova** (Northern (Arctic) Federal University, Russia)

Asymptotically isospectral periodic graphs

17:30-17:55: **V.V. Marchenko** (Bauman Moscow State Technical University, Russia), **M.M. Malamud** (RUDN University, Russia)

Invariant 3D-Schrödinger operator with point interactions

17:55-18:20: **M.M. Malamud** (Peoples' Friendship University of Russia named after Patrice Lumumba, Russia), **V.V. Marchenko** (Bauman Moscow State Technical University, Russia)

To the Grinevich-Novikov problem regarding invariant Schrodinger operators with point interactions

18:20-18:45: **A.S. Demidov** (MSU, Russia), **Samokhin** (MSU, Russia)

Explicit formulas for Poincaré--Steklov operators and their numerical implementation

Session «Mathematical modeling and computational mathematics» (the second stream)

Chair: M.A. Shishlenin

14:00-14:30: **O.I. Krivorotko** (Moscow Institute of Physics and Technology (Russia), Sobolev Institute of Mathematics SB RAS, Russia), **S.I. Kabanikhin** (Sobolev Institute of Mathematics SB RAS, Russia); **N. Zyatkov** (Sobolev Institute of Mathematics SB RAS, Russia)

Inverse problem of economic growth model under epidemic conditions and deep learning regularization

14:30-15:00: **A.S. Bratus** (Russian University of Transport, Russia), A. Nepogodin (Russian University of Transport, Russia)

Mathematical model of population dynamics with sequential modification genotypes

15:00-15:30: **A.V. Lapin** (MIPT, I.M. Sechenov First Moscow State Medical University, INM RAS, Russia)

Grid approximations of some nonlinear equations and differential inclusions with fractional time derivatives

15:30-16:00: **M.V. Balashov** (ICS RAS, Russia)

About the interior of one set-valued integral

16:00-16:30: **T. Zvonareva** (Sobolev Institute of Mathematics SB RAS, Russia), O.I. Krivorotko (Sobolev Institute of Mathematics SB RAS, Russia)

Regularization of the information propagation in online social networks based on mean-field theory

16:30: - 17:00: **A.V. Neverov** (The Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia), O.I. Krivorotko (Sobolev Institute of Mathematics SB RAS, Russia)

Numerical implementation of an inverse mean field game problem in epidemiology

Wednesday, December 6

Plenary Session (the second stream)

Chair: S.I. Kabanikhin

9:30-10:05: **P.G. Grinevich** (Lomonosov Moscow State University, L.D.Landau Institute for Theoretical physics RAS, Steklov Mathematical Institute of RAS, Russia), R.G. Novikov (CMAP, École Polytechnique, France; IEPT RAS, Russia)

Point scatterers and transmission eigenvalues

10:05-10:40: **В.В. Шайдуров** (Институт вычислительного моделирования СО РАН, Россия), О.Чередниченко (Сибирский федеральный университет, Россия)

Полулагранжевы аппроксимации уравнения конвекции-диффузии с локально-интегральным законом сохранения квадрата решения

10:40-11:15: **A.A. Shanin** (MIPT, Russia), N.K.Obrosova (Federal Research Center «Computer Science and Control» of RAS, Russia)

Scenario analysis of inflationary risks in the context of economic restructuring and resource constraints: models of intersectoral balance taking into account the substitution of production factors

Coffee break

11:25-12:00: **I.B. Petrov** (MIPT, Russia)

Numerical solutions of the industrial arctic problems

12:00-12:35: **O. Baysal** (University of Malta, Malta), A. Hasanov (Kocaeli University, Türkiye)
Reconstruction algorithm of shear force in atomic force microscopy from measured displacement

12:35-13:10: **T. Hohage** (University of Goettingen, Germany)
Quantitative passive imaging by iterative helioseismic holography

13:10: Lunch

Session «Inverse problems of mathematical physics» (the second stream)

Chair: M.I. Belishev

14:00-14:25: **S. Meng** (Academy of Mathematics and Systems Science, Chinese Academy of Sciences, China) Learning
Data-Driven Basis for Inverse Scattering

14:25-14:50: **K.B. Sabitov** (Institute of Mathematics with Computing Center of the UFIC RAS (Russia, Ufa), Samara State Technical University, Russia)
Inverse problems for the Helmholtz equation

14:50-15:15: **V.N. Sivkin** (Moscow State University, Russia), R.G. Novikov (CMAP, École Polytechnique, France) G.V. Sabinin (Moscow State University, Russia)
Multipoint formulas in inverse problems and their numerical implementation

15:15-15:40: **M. Santacesaria** (University of Genoa, Italy)
Compressed sensing for the sparse Radon transform

Coffee break

15:50-16:15: **L.N. Pestov** (IKBFU, Russia), V. Nosikova (West Department of IZMIRAN, Russia)
Visualizing of scattered waves by the Boundary Control Method, numerical experiment

16:15-16:40: A.S. Mikhaylov, **V.S. Mikhaylov** (PDMI RAS, SPbSU, Russia)
Dynamic inverse problem for complex Jacobi matrices and related problems

16:40-17:05: **A. Timonov** (Steklov Mathematical Institute (S.Petersburg branch), Russia), University of South Carolina Upstate, USA)
Computational comparison between some numerical methods for image denoising and deblurring

17:05-17:30: **R.V. Zaytsev** (Higher School of Economics, Russia), R.G. Novikov (CMAP, École Polytechnique, France), M. Isaev (Monash University, Australia)
PSWF-Radon approach to reconstruction from band-limited Hankel transform

17:30-17:55: **Rakesh** (University of Delaware, USA), M. Salo (University of Jyväskylä, Finland), L. Oksanen (University of Helsinki, Finland)
The fixed angle scattering problem for velocity

17:55-18:20: **V.V. Kravchenko** (Center for Research and Advanced Studies of National Polytechnic Institute, Mexico)

Reconstruction techniques for complex potentials

18:20:-18:45: **N. Bondarenko** (Saratov State University, Russia)

Inverse spectral problem for the fourth-order differential equation

Session «Numerical methods» (the third stream)

Chair: I.B. Petrov

14:00-14:25: **A. Vasyukov** (MIPT, Russia)

Direct numerical modeling and convolutional neural networks for medical ultrasound problems

14:25- 14:50: **A.V. Favorskaya** (MIPT, Russia)

Grid-characteristic method on Chimera and body-fitted grids

14:50:- 15:15: **S.A. Lavrenkov** (MIPT, Russia), A. Vasyukov (MIPT, Russia)

Acquiring elastic properties of isotropic thin plate from vibration testing experimental data

15:15-15:40: **V.I. Zubov** (Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Russia)

Experience of simultaneous identification of volumetric heat capacity and thermal conductivity of a substance

15:40-16:05: **M. Fouad** (University of Bejaia, Algérie)

Influence of the step descente stochastic algorithm in the convergence of linear inverse problems

16:05: - 16:30: **A.V. Shevchenko** (Institute for Computer Aided Design RAS; MIPT, Russia), V. Golubev (MIPT, Russia),

Investigation of Reverse-Time Migration for acoustic and elastic models

Session «Mathematical modeling in economics and epidemiology» (the third stream)

Chair: N.K.Obrosova

16:40:-17:05: **K. Golubnichiy** (University of Calgary, Canada)

Ill-Posed Problem for the Black-Scholes Equation solution and Machine Learning

17:05:-17:30: **N.V. Trusov** (MSU, MIPT, Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Russia), A.A. Shananin (MSU, MIPT, Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Russia)

Mathematical modeling of the household behavior in the labor market

17:30:-17:55: **L.V. Egorov** (Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Russia)

The Schumpeterian dynamics with heterogeneous imitation range

17:55:-18:20: **O.I. Lavrin** (MIPT, Russia)

Uniqueness of prices in non-linear input-output models

18:20:-18:45: **N.K. Obrosova** (Applied Mathematics, Lomonosov Moscow State University, Federal Research Center «Computer Science and Control» of Russian Academy of Sciences, Russia), **A. Shanin** (Moscow Institute of Physics and Technology, Russia), **A. Spiridonov** (Federal Research Center «Computer Science and Control» of Russian Academy of Sciences, Russia)

An economic growth model incorporating the epidemic labor force shift

19:00: Conference closing (the second stream)