International Conference

Days on Diffraction 2021

May 31 – June 4, 2021

St. Petersburg

Program

Monday, May 31, 2021

	Underwater acoustics Chair: Valeriy Petnikov
11.00	Salin M.B., **Razumov D.D.**, Dosaev A.S.: Study of the Doppler spectrum of surface reverberation using numerical simulation
11.20	**Kozitskiy S.B.**, Petrov P.S., Trofimov M.Yu.: On the numerical solution of the iterative parabolic equations by the ETDRK pseudospectral methods
11.40	**Kazak M.S.**, Petrov P.S., Koshel K.V.: The study of acoustic modes back-scattering by bottom relief inhomogeneities using the invariant imbedding method
12.00	**Sorokin M.A.**: Propagation on broadband signals in shallow-to-deep scenario: preservation and eventual loss of modal components' identity
12.20	Grigoriev V.A., Lunkov A.A., Petnikov V.G., **Sidorov D.D.**: Horizontal refraction of acoustic waves in a shallow water waveguide with inhomogeneous bottom
12.40	**Coffee break**

	Acoustics and elastic waves (I) Chair: Sergei Nazarov
13.00	**Lucas Chesnel**, Jérémy Heleine, Sergei A. Nazarov: Acoustic cloaking using thin resonant ligaments
13.20	Lucas Chesnel, **Jérémy Heleine**, Sergei A. Nazarov: Design of a mode converter using thin resonant slits
13.40	**Nazarov S.A.**: Eigenvalues and threshold resonances in a quantum waveguide with a wide Neumann window
14.00	**Nazarov, A.I.**, Nazarov, S.A., Zavorokhin, G.L.: Symmetric wedge wave in an elastic solid
14.20	**Wilde M.V.**, Surova M.Yu.: Dispersion and attenuation of fundamental edge waves in a two-layered plate: 3D solution and approximate theories
14.40	**Coffee break**

	Partial differential equations Chair: Anton Savin
15.00	**Borisov D.I.**: Resolvents of elliptic operators on quantum graphs with small edges: holomorphy and Taylor series
15.20	**Duduchava R.**: Prandtl equation in Kondratjev spaces
15.40	**Sipailo P.A.**, Nazaikinskii V.E., Savin A.Yu.: A Sobolev problem with nonlocal conditions on a Riemannian manifold
16.00	**Michael Hitrik**: Asymptotic Bergman kernels in the analytic case
16.20	**Sergey Vakulenko**: Superwaves create complicated phenotypes by short genotypes

Tuesday, June 1, 2021

	Localized waves Chair: Aleksei Kiselev
11.00	Alexeyev C.N., **Barshak E.V.**, Vikulin D.V., Lapin B.P., Yavorsky M.A.: Vortex-generation in the system of multihelical and twisted anisotropic optical fibers
11.20	**Irina A. So**, Alexandr B. Plachenov, Aleksei P. Kiselev: Simple unidirectional electromagnetic few-cycle pulses
11.40	**Petnikova V.M.**, Makarov V.A.: Angular momentum of Airy beams under diffraction
12.00	Fedorov S.V., **Rosanov N.N.**, Veretenov N.A.: Wormhole solitons in lasers with saturable absorption
12.20	**Letrou C.**, Hariz M., Boag A.: Frame-based Gaussian beam shooting analysis of monostatic scattering
12.40	**Zalipaev, V.V.**: Edge-scattering of Gaussian beams and geometrical theory of diffraction
13.00	**Coffee break**
	Heun functions and applications (I) Chair: Mikhail Babich
13.20	**Shanin A.V.**: A wave-related integral identity for solutions of Heun equation and for other special functions
13.40	**Takemura Kouichi**: Heun's differential equation, integral transformation and q-deformation
14.00	Birkandan T., **Giscard P.-L.**, Tamar A.: A Python implementation of the general Heun function using elementary integral series
14.20	**Simon Goertz**, Yi Zhang, Martin Oberlack: General Heun functions in free shear layer acoustics
14.40	**Dereziński, J.**, Latosiński, A., Ishkhanyan, A.: From Heun class equations to Painlevé equations
15.00	**Coffee break**
	Heun functions and applications (II) Chair: Andrey Shanin
15.20	Babich M.V., **Kalinin K.M.**: Parametrization of phase space of Painlevé V equation
15.40	**Smirnov A.O.**: New class of the finite-gap Fuchsian equations
16.00	Ivanov A.V., **Panteleeva P.Yu.**: Homoclinic transversal trajectories of singularly perturbed periodic Hamiltonian systems with disappearing separatrix
16.20	**Zhang Y.**, Oberlack M.: Over-reflection of acoustic waves by compressible boundary layer flows
16.40	**Kiselev, O.M.**: Evolution of basins of attraction in perturbed Painlevé-2 equation
17.00	**Coffee break**
	Electromagnetics Chair: Tatiana Zaboronkova
17.20	**Galyamin S.N.**, Tyukhtin A.V., Vorobev V.V.: Diffraction of a waveguide mode at the open-end of a dielectric-loaded circular waveguide
17.40	**Ivanova, E.A.**: Modeling of electrodynamic processes by means of a micropolar continuum
18.00	Tikhov S.V., **Valovik D.V.**: Nonlinear guided electromagnetic waves in circle cylindrical waveguide
18.20	Kudrin A.V., **Zaboronkova T.M.**, Zaitseva A.S., Bazhilova E.V.: Radiation resistance of a crossed-loop antenna in a magnetoplasma

Wednesday, June 2, 2021

	Acoustics and elastic waves (II) Chair: Evgeny Glushkov
11.00	**Nasedkin A.V.**: Numerical study of focusing ultrasonic spherical transducers from porous piezoceramics with multielectrode covering of same area
11.20	**Garbuzov F.E.**, Semenova I.V., Belashov A.V., Beltukov Y.M.: Formation of solitary strain waves in viscoelastic waveguides
11.40	**A. Mubaraki**, D.A. Prikazchikov: Elastic surface waves on a coated vertically inhomogeneous half-space
12.00	**Nethercote M.A.**, Kisil A., Assier R. C.: Edge diffraction of acoustic waves by periodic composite metamaterials: the hollow wedge
12.20	*cancelled*

12.40	**Coffee break**

	Acoustics and elastic waves (III) Chair: Danila Prikazchikov
13.00	**D.D. Zakharov**: Exact formulation of nonlocal transparent boundary conditions in wave problems for a layered or FG elastic strip, plate, and cylinder
13.20	**Shpak A.N.**, Golub M.V., Fomenko S.I., Mueller I.: Theoretical and experimental analysis of the piezo-induced Lamb waves for identification of defects between a waveguide and surface-mounted objects
13.40	**Ermolenko O.A.**, Fomenko S.I., Glushkov E.V., Glushkova N.V. , Tatarinov A.: The influence of cortical bone thickness, soft tissue, and porosity on ultrasonic guided wave propagation
14.00	**Golub M.V.**, Doroshenko O.V., Fomenko S.I., Gu Y.: The boundary integral equation method for the simulation guided waves scattering by a distribution of cracks in a laminate

14.20	**Coffee break**

	Asymptotic methods (I) Chair: Andrei Shafarevich
14.40	Dobrokhotov S.Yu., Minenkov D.S., **Nazaikinskii V.E.**: Bessel functions and semiclassical asymptotics
15.00	**Fedotov A.A.**: Solutions to quasiperiodic equations: selfsimilarity and quantization conditions
15.20	Ivanov A.V., **Kharuk N.V.**: Linear combinations of Seeley–DeWitt coefficients and their properties
15.40	Fedotov A.A., **Lukashova I.I.**: On self-similar solutions to some difference equations
16.00	**Ivanov A.V.**: On linear cocycles over irrational rotations with secondary collisions

16.20	**Coffee break**

	Asymptotic methods (II) Chair: Vladimir Nazaikinskii
16.40	**Sergeev S.A.**: Asymptotic solution for the explicit difference scheme for the wave equation
17.00	**Danilov V.G.**, Frolovichev S.M.: Exact asymptotics for the exit problem at infinity for diffusion processes
17.20	**Francis White**: Propagation of global analytic singularities for Schrödinger equations with quadratic hamiltonians
17.40	**Brunello Tirozzi**, Paolo Buratti: Stability of equilibrium states of the Protosphera
18.00	**Perel, M.V.**: A strict mathematical problem for quasiphotons

Thursday, June 3, 2021

	Asymptotic methods (III) Chair: Alexander Fedotov
11.00	**Anikin A.Yu.**: Efficient asymptotic solution for linearized one-dimensional run-up problem with dispersion
11.20	**Bogaevsky I.A.**: Two-dimensional stationary massless Dirac equation: singularities of phases of semi-classical asymptotics
11.40	**Dobrokhotov S.Yu.**: Constructive uniform semiclassical asymptotics of polynomials defined by second-order recurrent equations
12.00	**Tsvetkova A.V.**: An application of the method of real-valued semiclassical approximation for the asymptotics with complex-valued phases to multiple orthogonal Hermite polynomials
12.20	**Tolchennikov A.A.**: On the effect of intersection of characteristics in a two-dimensional massless Dirac equation with linear potential and localized initial data
12.40	**Coffee break**
	Asymptotic methods (IV) Chair: Sergey Dobrokhotov
13.00	Abdelwaheb Ifa, Hanen Louati, **Michel Rouleux**: On semi-classical spectral series for an atom in a periodic polarized electric field
13.20	**Shafarevich A.I.**: Short-wave asymptotic solutions of the wave equation with localized perturbations of the velocity
13.40	Shafarevich A.I., **Shchegortsova O.A.**: Semiclassical asymptotics of the solution to the problem of scattering of Gaussian beams on a Delta-potential
14.00	**Allilueva A.I.**: Asymptotic solutions of a system of gas dynamics with low viscosity that describe smoothed discontinuities
14.20	**Coffee break**
	Wave propagation in thin layers (I) Chair: Valery Smyshlyaev
14.40	**Michael Berry**: The brilliant Raman stumbles
15.20	**J.R. Ockendon**, H. Ockendon, C.L. Farmer: Time-domain wave propagation in layered media
15.40	**I. David Abrahams**: Wave propagation in and by thin plates and waveguides containing inhomogeneities
16.00	**Shanin A.V.**, Korolkov A.I., Kniazeva K.S.: Carcasses of dispersion diagrams and pulses in waveguides
16.20	Fedotov A.A., **Sergeyev V.A.**: On adiabatic evolution generated by a one-dimensional Schrödinger operator
16.40	**Coffee break**
	Wave propagation in thin layers (II) Chair: John Ockendon
17.00	**Popov M.M.**: New concept of the surface waves of interference nature: creeping waves
17.20	**Anna Kirpichnikova**, Nataliya Kirpichnikova: Matching creeping waves with lit area diffraction field
17.40	**Smyshlyaev V.P.**: Whispering gallery waves' diffraction by boundary inflection: searchlight asymptotics, wave operators, and an integral equation
18.00	**Richard H. Tew**: Solution methods for the Helmholtz equation within and across thin layers
18.20	**Ekaterina A. Zlobina**, Aleksei P. Kiselev: Alexey Popov's diffraction by a jump of curvature revised

Friday, June 4, 2021

	Water waves Chair: Nikolay Kuznetsov
11.00	**Bennetts L.G**., Peter M.A.: Rayleigh–Bloch waves above the first cut-off and higher-order resonant loads on straight-line cylinder arrays
11.20	**Lyalinov M.A.**, Polyanskaya S.V.: A model problem of fluid current in a deep canal with rigid walls terminated by a sloping plane
11.40	**Denisova I.V.**, Solonnikov V. A.: The problem on the rotation of a two-phase drop
12.00	**Minenkov D.S.**: Asymptotics of one-dimensional standing long waves on shallow water
12.20	Nazarov, S.A., **Taskinen, J.**: Spectra of Steklov and Robin-Laplace-problems in bounded, cuspidal domains

12.40	**Coffee break**

	Numerical approaches Chair: Leonid Goray
13.00	Petukhov A.A., **Artemeva M.V.**: Solving diffraction gratings synthesis problems with multiperiodic profile using gradient-based methods
13.20	Goray L.I., **Dashkov A.S.**: A combined optimization technique for the engineering of optical devices
13.40	**Evdokimov A.A.**, Glushkov E.V., Glushkova N.V.: Hybrid numerical-analytical scheme for 3D scattering problems
14.00	Kuttler Ch., **Maslovskaya A.G.**, Moroz L.I.: Numerical simulation of time-fractional diffusion-wave processes applied to communication in bacterial populations
14.20	Turichina D.G., **Il'in V.B.**, Farafonov V.G.: On the relation between the T-matrices for different spheroidal and spherical bases in the axisymmetric problem of light scattering by a spheroid

14.40	**Coffee break**

	Spectral theory methods Chair: Valery Smyshlyaev
15.00	**Pastukhova S.E.**: On resolvent approximations for elliptic high order operators with periodic coefficients
15.20	**Saburova N.Yu.**: Spectrum of Laplacians on periodic graphs with waveguides
15.40	**Dorodnyi M.A.**, Suslina T.A.: Homogenization of nonstationary periodic Maxwell system in the case of constant permeability
16.00	**Savin A.Yu.**, Semenova E.N.: On some spectral problems in relative elliptic theory

Program of the Mini-Symposium "Inverse Problems"

Chairman: **Mikhail Belishev**

Tuesday, 1 June, 2021

Morning session	
11.00−11.30	**Gen Nakamura**: Holmgren–John unique continuation theorem for viscoelastic systems
11.35−12.05	**R.G. Novikov**: Multipoint formulas for inverse scattering at high energies
12.10−12.40	**Alexandre Jollivet**: Boundary control for transport equations
Coffee break	
13.00−13.30	**Karabash Illia**: Optimization of resonances in photonic crystals and related Hamilton–Jacobi–Bellman equations

Evening session	
16.00−16.30	**Kaplun A.V.**: Canonical representation of C*-algebra associated with metric graph
16.35−17.05	**Matthas Eller**: Parametrix for the inverse source problem of thermoacoustic tomography with reduced data

Wednesday, 2 June, 2021

Morning session	
11.00−11.30	**Masaru Ikehata**: The time domain enclosure method for an inverse obstacle problem governed by the Maxwell system
11.35−12.05	**Timonov, Alex**: Regularization of the boundary control method via the mean curvature flow
12.10−12.40	**Oksanen L.**, Burman E., Feizmohammadi A., Münch A.: Finite element methods for inverse initial source and control problems subject to the wave equation

Evening session	
16.00−16.30	**M.N. Demchenko**: On the analogue of Kirchhoff's formula for the wave equation in a two-dimensional domain
16.35−17.05	**Alexandru Tamasan**: On a two dimensional inverse source problem in a scattering medium with partial boundary data

Thursday, 3 June, 2021

Morning session	
11.00−11.30	**Takashi Furuya**: The monotonicity method for the inverse crack scattering problem
11.35−12.05	**Yavar Kian**: Inverse problem for non-linear parabolic equations
12.10−12.40	**Chebotarev A.Yu.**, Kovtanyuk A.E., Degtyareva A.V., Mesenev P.R.: Optimal control with phase constraints for a quasilinear endovenous laser ablation model
Coffee break	
13.00−13.30	**Filatova V.M.**: Detection of small-scale inhomogeneities in an elastic-acoustic medium

Evening session	
16.00−16.30	M.I. Belishev, **D.V. Korikov**: Some results on Electric Impedance Tomography of surfaces
16.35−17.05	**Ali Feizmohammadi**: Lorentzian Calderón problem under curvature bounds

Friday, 4 June, 2021

Morning session	
11.00−11.30	**Kovtanyuk A.E.**, Chebotarev A.Yu., Seleznev T.E., Lampe R.: Reconstruction of unknown sources in cerebral oxygen transport model
11.35−12.05	Mikhaylov A.S., **Mikhaylov V.S.**: Hilbert spaces of functions related to dynamical system with discrete time associated with finite and semi-infinite Jacobi matrices.
12.10−12.40	Grigoriev V.A., Lunkov A.A., **Petnikov V.G.**: Geoacoustic inversion of vertical line array data in shallow water with an ice cover

Evening session	
16.00−16.30	M.I. Belishev, **N.A. Karazeeva**: Töplitz matrices in the BC-method
16.35−17.05	**Lili Yan**: Inverse boundary problems for biharmonic operators in transversally anisotropic geometries