

Workshop

From Modeling and Analysis to Approximation and Fast Algorithms



Hasenwinkel

September 02-06, 2023

Organizing Committee

Irina Kmit (Humboldt-Universität Berlin)

Dirk Langemann (Technische Universität Braunschweig)

Jürgen Prestin (Universität zu Lübeck)

Barbara Zwicknagl (Humboldt-Universität Berlin)

A meeting within the “VolkswagenStiftung” project:

From Modeling and Analysis to Approximation

Program Overview

Time	Saturday	Time	Sunday	Monday	Tuesday	Wednesday
		09:00 - 10:00	Derevianko	Bergmann	Davydov	Savchenko
		10:00 - 10:30	Vasylyk	Rieger	Kolomoitsev	Langemann
		10:30 - 11:00	Coffee break			
		11:00 - 11:30	Zwicznagl	Filbir	Vasylyeva	Tüting
		11:30 - 12:00	Buryachenko	Schoppert	Sytnyk	Prestin
		12:00 - 12:30	Karabash	Kholkin	Veselovska	
		12:30 - 14:30	Lunch break			
15:00-15:10	Opening	14:30 - 15:00			Kovalyov	
15:10-16:10	Melnyk	15:00 - 15:30	Walking-tour	Kmit	Nguyen	
		15:30 - 16:00		Tkachenko	Semenova	
16:10-16:50	Coffee break	16:00 - 16:45	Coffee break			
16:50-17:20	Shidlich	16:45 - 17:15	Dubovoy	Zavarzina	Rovenska	
17:20-17:50	Pozharska	17:15 - 17:45	Stepaniuk	Burylko	Yanchenko	
17:50-18:20	Sokolenko	17:45 - 18:15	Petrov	Discussion of future research	Stasyuk	
		18:15 - 19:00	Group leader meeting			

All **talks** will take place at *Remise*

Breakfast and **Lunch** will be served at the dining room at *Schloss*

Dinner will be served at *Marstall* or at *Schloss*

Program

Saturday

15.00 - 15.10 *Opening*

Chair: Irina Kmit

15.10 - 16.10 **Oleh Melnyk**

Convergence of iterative methods for phase retrieval and blind ptychography

16.10 - 16.50 *Coffee break*

Chair: Yurii Kolomoitsev

16.50 - 17.20 Andrii Shidlich

Direct and inverse approximation theorems in the Besicovitch-Musielak-Orlicz spaces of almost periodic functions

17.20 - 17.50 Kateryna Pozharska

Sampling recovery in the uniform norm

17.50 - 18.20 Igor Sokolenko

Approximation by Fourier sums and interpolation trigonometric polynomials in the classes of Weyl-Nagy differentiable functions with high exponent of smoothness

Sunday

Chair: Oleh Melnyk

09.00 - 10.00 **Nadiia Derevianko**
Prony-type methods for recovery and approximation by exponential sums

10.00 - 10.30 Vitalii Vasylyk
Exponentially convergent method for a differential equation with fractional derivative and unbounded operator coefficient in Banach space

10.30 - 11.00 *Coffee Break*

Chair: Ronny Bergmann

11.00 - 11.30 Barbara Zwicknagl
Variational models for pattern formation in helimagnetic compounds

11.30 - 12.00 Kateryna Buryachenko
Regularity problems for anisotropic porous media equations

12.00 - 12.30 Illia Karabash
Calkin reduction operators in boundary conditions for open optical cavities

12.30 - 14.30 *Lunch*

14.30 *Walking-tour*

16.00 - 16.45 *Coffee break*

Chair: Illia Karabash

16.45 - 17.15 Volodymyr Dubovoy
Schur functions as characteristic operator functions of unitary colligations (transfer functions of open systems)

17.15 - 17.45 Tania Stepaniuk
Upper and lower boundaries for Green, Riesz and logarithmic energies on projective spaces

17.45 - 18.15 Evgeniy Petrov
Fixed point theorems for mappings contracting perimeters of triangles and generalized Kannan type mappings

18.15 - 19.00 *Group leader meeting*

Monday

Chair: Mariia Savchenko

09.00 - 10.00 **Ronny Bergmann**
Nonsmooth, nonconvex optimization on Riemannian manifolds

10.00 - 10.30 Christian Rieger
RBF for Surface PDEs

10.30 - 11.00 *Coffee Break*

Chair: Christian Rieger

11.00 - 11.30 Frank Filbir
Marcinkiewicz-Zygmund inequalities for scattered and random data on the q -dimensional unit sphere

11.30 - 12.00 Frederic Schoppert
Edge detection with polynomial frames on the sphere

12.00 - 12.30 Aleksandr Kholkin
Interplay between spectral and oscillatory properties of differential-operator equations of arbitrary even order

12.30 - 15.00 *Lunch*

Chair: Barbara Zwicknagl

15.00 - 15.30 Irina Kmit
Hyperbolic operators with finite time propagation of singularities

15.30 - 16.00 Viktor Tkachenko
Smoothness of global bounded solutions to non-autonomous linear and quasi-linear first order hyperbolic systems

16.00 - 16.45 *Coffee break*

Chair: Oleg Davydov

16.45 - 17.15 Olesia Zavarzina
Plasticity problem and related questions

17.15 - 17.45 Olexandr Burylko
Time-reversible dynamics in a system of two coupled active rotators

17.45 - 18.15 *Discussion of future research*

Tuesday

Chair: Frank Filbir

- 09.00 - 10.00 **Oleg Davydov**
Meshless finite difference methods and overlap splines
- 10.00 - 10.30 Yurii Kolomoitsev
Spline representation and redundancies of one-dimensional ReLU neural network model

10.30 - 11.00 *Coffee break*

Chair: Andrii Shidlich

- 11.00 - 11.30 Nataliya Vasylyeva
Multi-term fractional equations modeling oxygen delivery through capillaries to tissues
- 11.30 - 12.00 Dmytro Sytnyk
Exponentially convergent numerical method for abstract Cauchy problem with fractional derivative of Caputo type
- 12.00 - 12.30 Hanna Veselovska
Surrogate modelling using sparse random features

12.30 - 14.30 *Lunch*

Chair: Vitalii Vasylyk

- 14.30 - 15.00 Ivan Kovalyov
Two-dimensional moment problem
- 15.00 - 15.30 Thu Hien Nguyen
The distribution of zeros of polynomials and entire functions
- 15.30 - 16.00 Evgeniya Semenova
On optimal recovering of high order derivatives of bivariate functions with noisy data

16.00 - 16.45 *Coffee break*

Chair: Nadiia Derevianko

- 16.45 - 17.15 Olga Rovenska
Exact constants in estimates of approximation of Lipschitz classes by Cesàro means
- 17.15 - 17.45 Sergii Yanchenko
Kolmogorov widths and entropy numbers of the classes of periodic functions of many variables with dominating mixed smoothness
- 17.45 - 18.15 Serhii Stasyuk
Best m -trigonometric approximation, Gelfand numbers and optimal recovery

Wednesday

Chair: Thu Hien Nguyen

09.00 - 10.00 **Mariia Savchenko**
Harnack's inequality for solutions of elliptic equations with non-standard growth under the non-logarithmic Zhikov's condition

10.00 - 10.30 Dirk Langemann
Modeling coexisting populations - the power of illustration

10.30 - 11.00 *Coffee break*

Chair: Dirk Langemann

11.00 - 11.30 Katja Tüting
A model of measurement - examples, uncertainty and calibration

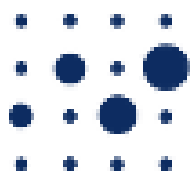
11.30 - 12.00 Jürgen Prestin
Fractional Fourier series for linear chirps

Participants

Ronny Bergmann	NTNU Trondheim
Kateryna Buryachenko	Humboldt-Universität Berlin and Donetsk
Olexandr Burylko	WIAS Berlin and Kyiv
Oleg Davydov	Justus-Liebig-Universität Gießen
Nadiia Derevianko	Georg-August-Universität Göttingen
Volodymyr Dubovoy	Humboldt-Universität Berlin and Kharkiv
Tamara Fastovska ¹⁾	Humboldt-Universität Berlin and Kharkiv
Frank Filbir	Helmholtz Zentrum München
Illia Karabash	Universität Bonn, formerly IAMM of NAS of Ukraine
Aleksandr Kholkin	Pryazovskyi State Technical University
Irina Kmit	Humboldt-Universität Berlin
Yurii Kolomoitsev	Georg-August-Universität Göttingen and Donetsk
Ivan Kovalyov	Universität Osnabrück and Donetsk
Dirk Langemann	Technische Universität Braunschweig
Oleh Melnyk	Technische Universität Berlin
Thu Hien (Hisha) Nguyen	Universität Würzburg and Kharkiv
Evgeniy Petrov	Universität zu Lübeck and Donetsk
Kateryna Pozharska	Technische Universität Chemnitz and Kyiv
Jürgen Prestin	Universität zu Lübeck
Christian Rieger	Universität Marburg
Olga Rovenska	Universität zu Lübeck and Kyiv
Mariia Savchenko	Technische Universität Braunschweig and Donetsk
Frederic Schoppert	Universität zu Lübeck
Evgeniya Semenova	Universität zu Lübeck and Kyiv
Mariia Serdiuk ¹⁾	Taras Shevchenko National University of Kyiv
Anatolii Serdyuk	Universität zu Lübeck and Kyiv
Andrii Shidlich	Universität zu Lübeck and Kyiv
Igor Sokolenko	Universität zu Lübeck and Kyiv
Serhii Stasyuk	Technische Universität Chemnitz and Kyiv
Tania Stepaniuk	Universität zu Lübeck and Kyiv
Dmytro Sytnyk	Technische Universität München and Kyiv
Viktor Tkachenko	Humboldt-Universität Berlin and Kyiv

Katja Tüting	Technische Universität Braunschweig
Nataliya Vasylyeva	POLIMI Milano and Donetsk
Vitalii Vasylyk	Academy of Sciences of Ukraine, Kyiv
Hanna Veselovska	Technische Universität München and Kyiv
Sergii Yanchenko	Universität zu Lübeck and Kyiv
Olesla Zavarzina	Technische Universität Braunschweig and Kharkiv
Barbara Zwicknagl	Humboldt-Universität Berlin

¹⁾ cancelled at short notice



VolkswagenStiftung



UNIVERSITÄT ZU LÜBECK



HUMBOLDT-UNIVERSITÄT ZU BERLIN



Special thanks go to the team of the hotel Schloss Hasenwinkel.

Schloss Hasenwinkel



TAGUNGSHOTEL DER WIRTSCHAFT