RNDr. Michal Bathory, Ph.D.

CONTACT INFORMATION

University of Vienna, Faculty of Mathematics
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PERSONAL DATA

Date and place of birth: March 29, 1992, Plzeň, Czech Republic
Address: U Školky 449
250 67 Klecany, Czech Republic

INTEREST

PDE analysis, variational methods, continuum mechanics, viscoelastic fluids, mathematical modelling
Hardy-type inequalities, r.i. spaces, interpolation

EDUCATION

2016–2020 PhD: Mathematical and Computer Modelling
Charles University, Faculty of Mathematics and Physics
Thesis: *Analysis of unsteady flows of incompressible heat-conducting rate-type viscoelastic fluids with stress-diffusion*
Supervisor: Miroslav Bulíček

2014–2016 Master: Mathematical Modelling in Physics and Technology
Charles University, Faculty of Mathematics and Physics
Thesis: *Conjugate function*
Supervisor: Bohumír Opic

2011–2014 Bachelor: Mathematics
Charles University in Prague, Faculty of Mathematics and Physics
Thesis: *Conjugate Fourier series*
Supervisor: Bohumír Opic

SCIENTIFIC EXPERIENCE

Active participation in the conferences

EMS School Mathematical Aspects of Fluid Flows, Kácov, Czech Republic, May 2017 (short talk)
Fluids 2017, Bratislava, Slovakia, July 2017 (poster)

Implicitly constituted materials: Modelling, Analysis and Computing, Roztoky, Czech Republic, August 2017 (poster)

A Sussex School and Workshop on the Navier-Stokes and Euler Equations, Brighton, UK, September 2017 (poster)

SIAM Conference on Analysis of Partial Differential Equations, Baltimore, USA, December 2017 (poster)
Minisymposium on the Navier-Stokes equations, Prague, Czech Republic, February 2018 (poster)

Regularity theory for elliptic and parabolic systems and problems in continuum mechanics, Telč, Czech Republic, May 2018 (talk)

The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taipei, Taiwan, July 2018 (talk, poster)

2018 SIAM Annual Meeting (AN18), Portland, Oregon, USA, July 2018 (poster)

2nd Chinese-Czech conference on Mathematical Fluid Mechanics, Prague, Czech Republic, September, 2018 (talk)

EMS School Mathematical Aspects of Fluid Flows, Kácov, Czech Republic, May 2019 (short talk)

Progress in Mathematical Fluid Dynamics, Cetraro, Italy, June 2019 (talk)

Hausdorff School on Modeling and analysis of evolutionary problems in materials science, Bonn, Germany, September 2019

Multiscale Models for Complex Fluids: Modeling and Analysis (Online), Banff, Canada, November 2020 (talk)

Stays abroad

TU Wien, Vienna, Austria, visit of Ansgar Jüngel, 1 week in Nov. 2017, Nov. 2018 and Dec. 2019

HIM, Bonn, Germany, trimester *Evolution of interfaces*, January - April 2019

University of Vienna, two-year postdoc position in Ulisse Stefanelli's group, starting in August 2020

Projects

Role of boundary conditions in the analysis of flow of homogeneous incompressible fluids, Charles University Grant Agency (GAUK) - member of the team; 2017-2018

Analysis of a mathematical model of an incompressible viscoelastic rate-type fluid-like material with stress diffusion, GAUK - team member, 2019–2020;

Analysis of multicomponent fluid dynamical equations, bilateral project with Austria - team member; 2017, 2018, 2019

University center for mathematical modeling, applied analysis and computational mathematics, UNCE - member of the team; 2017, 2018, 2019

Publications

Bathory, M., *Joint weak type interpolation on Lorentz-Karamata spaces*, Math. Inequal. Appl., **21**, 2 (2018), 385–419.

Bathory, M., *Outflow Boundary Condition Leading to Minimal Energy Dissipation for an Incompressible Flow*, WDS'17 Proceedings of Contributed Papers – Physics, Prague, Matfyzpress, pp. 7–12 , 2017.

Bathory, M., Bulíček, M.: *Optimal outflow boundary condition for a stationary flow of an incompressible fluid*, preprint NCMM/2018/11, ncmm.karlin.mff.cuni.cz/publications/

Bathory, M., Bulíček, M., and Souček, O.: *Existence and qualitative theory for nonlinear elliptic systems with a nonlinear interface condition used in electrochemistry.* Z. Angew. Math. Phys. **71**, 74 (2020).

Bathory, M.: *Optimal inequalities in multiplication of derivatives of positive definite matrices and their powers*, Submitted. 2020. url: https://arxiv.org/abs/2007.15052.

Bathory, M., Bulíček, M., Málek, J.: Large data existence theory for three-dimensional unsteady flows of rate-type viscoelastic fluids with stress diffusion , Advances in Nonlinear Analysis **10**, 1 (2021), 501–521.

Other

Invited lecture *Existence of a solution to highly non-linear elliptic PDE with the interface condition* at Instytut Matematyczny, Uniwersytet Wrocławski in May 2018.

Former secretary of Charles University SIAM Student Chapter

AWARDS

2016: 1st place in the Competition for university students in mathematical research (SVOČ) in mathematical analysis

2018: Among 10 finalists in the student paper competition in Taipei