

# Darko Mitrović

## Curriculum Vitæ

Faculty of Mathematics  
University of Montenegro  
Cetinjski put bb  
81000 Podgorica  
☎ +382 67 402328  
✉ darkom@ac.me  
<https://web.math.pmf.unizg.hr/~dmitrovi/>

### Main Areas of Research

Functional analysis, evolution equations, flow in porous media.

### Education

- 2005 **Ph.D**, *University of Montenegro*, Montenegro.
- 2001 **MS**, *University of Novi Sad*, Serbia.
- 2001 **BSc**, *University of Montenegro*, Montenegro.

### Employment

- 2017– **Full Professor**, *University of Montenegro*, Montenegro.
- 2012–2017 **Associate Professor**, *University of Montenegro*, Montenegro.
- 2006–2012 **Assistant professor**, *University of Montenegro*, Montenegro.
- 2010 **Researcher, part time**, *University of Bergen*, Bergen, Norway.
- 2006–2007 **Postdoc**, *NTNU*, Trondheim, Norway.
- 2000–2006 **Teaching Assistant**, *University of Montenegro*, Montenegro.

### Supervised PhD Students

- 2017 **Marin Mišur**, *H-distributions and compactness by compensation*.
- 2017 **Andrej Novak**, *Mathematical models of flow in porous and mixed media*.
- 2009 **Jelena Aleksić**, *Conservation Laws in Heterogeneous Media*.

### 5 Selected Invited Lectures

- Feb 10, 2015 **Contemporary topics in conservation laws**, *Singular Solutions Concept for System of Conservation Laws*, University of Besancon, France.
- Sep 20, 2014 **Entropy and Singular Solutions for Conservation Laws: Pressureless Gas Dynamics and Other Applications**, *Singular Solutions for Systems of Conservation Laws*, West Virginia University, USA.
- Jun 1, 2010 **Multiscale Problems in Science and Technology**,  *$L^p - L^q$  variant of the div-curl lemma in the Galerkin setting*, University of Dubrovnik, Croatia.
- Mar 20, 2008 **The Mathematical Colloquium**, *On a strong precompactness of a sequence of solutions to a heterogenous transport equation*, University of Osijek, Croatia.
- Nov 2, 2006 **PDE seminar at CMA**, *Delta shock waves as a limit of shock waves*, University of Oslo, Norway.

### Peer review activities

Referee activities:

1 paper for Communications in Partial Differential Equations; 1 paper for Mathematische Nachrichten; 1 paper for Quarterly of Applied Mathematics; 1 paper for Mathematical Communications; 2 papers for Electronic Journal of Differential Equations; 1 paper for Journal of Mathematical Analysis and Applications; 1 paper for Mathematical and Computer Modelling; 4 papers for Zeitschrift für angewandte Mathematik und Physik; 1 paper for Nonlinearity; 2 papers for Filomat; 3 papers for Transport and Porous Media; 2 papers for Abstract and Applied Analysis; 1 paper for Differential and Integral Equations; 1 paper for Mediterranean Journal of Mathematics; 1 paper for Zeitschrift für angewandte Mathematik und Mechanik; 1 paper for Acta Mathematica Scientia; 1 paper for Computers and Mathematics with Applications; 1 paper for SIAM Journal of Mathematical Analysis; 1 paper for Results in Mathematics; 1 paper for Discrete and Continuous Dynamical Systems A; 1 paper for Archives for Rational Mechanics and Analysis; 1 paper for Pacific Journal of Mathematics; 3 papers for Communications on Pure and Applied Analysis, 1 paper in JESTECH etc...

### Selected Research Projects

- 2015–2017 **Flow problems on manifolds**, *Ministry of Science, Montenegro, and Ministry of Science, Austria.*
- 2014–2015 **Micro-local defect functionals and applications**, *European Commission and Ministry of Science, Education and Sport, Croatia.*
- 2012–2015 **Advection-diffusion equations in heterogeneous media**, *Ministry of Science, Montenegro.*
- 2012–2014 **Transport in highly heterogeneous media**, *Ministry of Science, Montenegro, and Ministry of Science, Croatia.*

### The Most Relevant International Cooperation Partners (in the last 5 years)

**Henrik Kalisch**, *University of Bergen, Norway.*

**Jan Martin Nordbotten**, *University of Bergen, Norway.*

**Michael Kunzinger**, *University of Vienna, Austria.*

**Boris Andreianov**, *University of Tours, France.*

**Nenad Antonić**, *University of Zagreb, Croatia.*

## Peer reviewed Publications (since 2013)

1. H.Kalisch, D.Mitrovic, V.Teyekpiti, *Existence and Uniqueness of Singular Solutions for a Conservation Law Arising in Magnetohydrodynamics*, accepted for publication in Nonlinearity.
2. K.Burazin, D.Mitrovic, *Apriori Estimates for Fractional Diffusion Equation*, accepted for publication in Optimization Letters.
3. Mitrovic, D.; Novak, A.; Uzunovic, T.: *Averaged Control for Fractional ODEs and Fractional Diffusion Equations*, Journal of function spaces 2018 (2018), ID 8095728, 12 pages.
4. Antonic, N.; Misur, M.; Mitrovic, D.: *On compactness of commutators of multiplications and Fourier multipliers*, Mediterranean Journal of Mathematics 15 (2018), 170 (13 pages).
5. Misur, M.; Mitrovic, D.: *On compactness of commutator of multiplication and pseudodifferential operator*, Journal of Pseudo-Differential Operators and Applications, DOI: 10.1007/s11868-018-0239-y.
6. Mitrović, D.; Novak, A.: *Transport-collapse scheme for heterogeneous scalar conservation laws*, Journal of Hyperbolic Differential Equations 15 (2018), 119–132
7. Graf, M.; Kunzinger, M.; Mitrovic, D.: *Well-posedness theory for degenerate parabolic equations on Riemannian manifolds*, Journal of Differential Equations 263 (2017), 4787–4825.
8. Kalisch H.; Mitrović, D.; Teyekpiti, V.: *Delta Shock Waves in Shallow Water Flow*, Physics Letters A 381 (2017), 1138-1144.
9. Lazar, M.;Mitrović, D.: *Existence of solutions for a scalar conservation law with a flux of low regularity*, Electronic Journal of Differential Equations Vol. 2016 (2016), No. 325, pp. 1-18.
10. Mitrovic, D.; Novak, A.: *Transport-collapse scheme for scalar conservation laws - initial-boundary value problem*, Communications in Mathematical Sciences 15 (2017), 1055–1071.
11. Lazar, M.; Mitrovic, D.: *On a new Class of Functional Spaces with an Application to Velocity Averaging*, Glasnik Matematički 52 (2017), 115–130.
12. Misur, M; Mitrovic, D.; Novak, A.: *On the Dirichlet-Neumann boundary problem for scalar conservation laws*, Mathematical Modelling and Analysis 21 (2016), 685-698.
13. Marohnic, M.; Mitrovic, D.; Novak, A.: *On a front evolution in porous media with a source – analysis and numerics*, Bulletin of the Brazilian Mathematical Society, 47 (2016), 521-532
14. Kalisch, H.; Mitrovic, D.; Nordbotten, J.M.: *Non-standard Shocks in the Buckley-Leverett Equation*, Journal of Mathematical Analysis and Applications, 428 (2015), 882–895.
15. Mitrovic, D.; Novak, A.: *Two phase nonturbulent flow with applications*, Mathematical Problems in Engineering, Volume 2015 (2015), Article ID 439704, 8 pages
16. Misur, M.; Mitrovic, D.: *On a generalization of compensated compactness in the  $L^p - L^q$  setting*, Journal of Functional Analysis 268 (2015), 1904-1927.
17. Kalisch, H.; Mitrovic, D., Nordbotten, J.: *Rayleigh-Taylor instability of immiscible fluids in porous media*, Continuum Mechanics and Thermodynamics, 28 (2016), 721-731
18. Andreianov, B.; Mitrovic, D.: *Entropy conditions for scalar conservation laws with discontinuous flux revisited*, Ann. Inst. H. Poincaré C Analyse Non Linéaire, 32 (2015), 1307-1335.
19. Mitrovic, D.; Nordbotten, J.M.; Kalisch, H.: *Dynamics of the interface between immiscible liquids of different densities with low Froude number*, Nonlinear Analysis Real World Applications, 15 (2014), 361–366
20. Aleksic, J.; Mitrovic, D.: *Strong traces for averaged solutions of heterogeneous ultra-parabolic transport equations*, J. of Hyperbolic Differential Equations 4 (2013), 659-676.
21. Mitrovic, D.: *On a Leibnitz type formula for fractional derivatives*, Filomat 27 (2013), 1141–1146.
22. Lazar, M; Mitrovic, D.: *On an extension of a bilinear functional on  $L^p(\mathbb{R}^d) \times E$  to a Bochner space with an application on velocity averaging*, C. R. Acad. Sci. Paris Ser. I Math. 351 (2013), 261–264.

## 10 Most Important Publications

1. Graf, M.; Kunzinger, M.; Mitrovic, D.: *Well-posedness theory for degenerate parabolic equations on Riemannian manifolds*, Journal of Differential Equations 263 (2017), 4787–4825.
2. Mitrovic, D.; Novak, A.: *Transport-collapse scheme for scalar conservation laws - initial-boundary value problem*, Communications in Mathematical Sciences 15 (2017), 1055–1071.
3. Misur, M.; Mitrovic, D.: *On a generalization of compensated compactness in the  $L^p - L^q$  setting*, Journal of Functional Analysis 268 (2015), 1904-1927.
4. Kalisch, H.; Mitrovic, D., Nordbotten, J.: *Rayleigh-Taylor instability of immiscible fluids in porous media*,

- Continuum Mechanics and Thermodynamics, 28 (2016), 721-731
5. Andreianov, B.; Mitrovic, D.: *Entropy conditions for scalar conservation laws with discontinuous flux revisited*, Ann. Inst. H. Poincaré C Analyse Non Linéaire, 32 (2015), 1307-1335.
  6. Lazar, M.; Mitrovic, D.: *Velocity averaging – general framework*, Dynamics of Partial Differential Equations, 9 (2012), 239-260
  7. Kalisch, H.; Mitrovic, D.: *Singular solutions of a fully nonlinear 2x2 system of conservation laws*, Proceedings of the Edinburgh Mathematical Society, 55 (2012), 711-729.
  8. Aleksic, J.; Mitrovic, D.; Pilipovic, S.: *Hyperbolic conservation laws with vanishing nonlinear diffusion and linear dispersion in heterogeneous media*, Journal of Evolution Equations, 9 (2009), 809-828.
  9. Mitrovic, D.: *New Entropy Conditions for Scalar Conservation Laws with Discontinuous Flux*, Discrete and Continuous Dynamical Systems-A, 30 (2011), 1191-1210.
  10. Danilov, V. G.; Mitrovic, D.: *Delta shock wave formation in the case of triangular hyperbolic system of conservation laws*, Journal of Differential Equations, 245 (2008) 3704-3734.