

# Šárka Nečasová (Matušů)

Date and place of birth: 26 April 1965; Prague, Czechoslovakia

Nationality: Czech

Family situation: 3 kids: Martin, Jan, Lucie

## Education

- 1979-1983 Grammar School, gymnasium of Sladkovský, Prague 3
- 1983-1988 Faculty of Mathematics and Physics, Charles University in Prague, RNDr. degree 1988,  
thesis: *Strongly Nonlinear Elliptic Equations and Their Numerical Solution by FEM*,  
**supervisor:** Prof. S. Feistauer.
- 1988-1991 PhD student, Faculty of Mechanical Engineering, Czech Technical University in Prague, Prague, CSc. degree 1991 (equivalent PhD.)  
thesis: *Quantitative and Qualitative Properties of Motion Equations and their Numerical Solution*,  
**supervisors:** Prof. J. Neustupa and Prof. K. Kozel

## Academic Career:

- Habilitation - Diriger des Recherches del'Université de Pau et des Pays de l'Adour (France), 2010
- DSc. (Doctor of Sciences) Academy of Sciences of the Czech Republic, 2013

### **Appointments and professional activities:**

1991 - 1995      Assistant Professor, Dept. of Mathematics, Faculty of Mechanical Engineering, Czech Technical University, Prague

1995 - 2010      Researcher, Institute of Mathematics, Czech Academy of Sciences of the Czech Rep., Prague

2010 - date      Head of the Department of Evolution DEs and Researcher, Institute of Mathematics, Czech Academy of Sciences of the Czech Rep., Prague,

### **Vice supervisor:**

Lukáš Grigerek (together with M.Lukáčová) - master thesis

Martin Kalousek ( together with Petr Kaplický)

### **Supervisor**

#### **supervisor of PhD study of:**

- Matteo Cagio (starting from September 2013)
- Martin Kobera (defending his thesis, September 2016, **Qualitative properties of radiation magnetohydrodynamics**)

supervisor of postdoctoral study of Y. Namlyeyeva, H. Al Baba, T. Nakatsuka

supervisor of bachelor thesis ( M. Šefl)

### **Teaching:**

1989 - 1995 **CTU** exercises, lecture on Mathematical modelling of non-Newtonian fluids

2000 **University of Pittsburgh** - calculus on algebra and mathematical analysis

**Faculty of Mathematics and Physics, Charles University** - regular lecture:

Lectures for magister and doctoral studies

*Mathematical modelling of bodies in viscous fluids* with M. Pokorný and P. Knobloch

Seminar on Partial Differential Equations with M. Pokorný

Seminar on Regularity of the Navier-Stokes equations

**One of the main organizer:**

- Partial differential Equations and Applications, Olomouc 1999 (To honor of Jindřich Nečas )
- Minisymposium (Š. Nečasová, M. Pokorný, J. Neustupa ) in the framework of International Conference on Fluid Dynamics and Aerodynamics, Corfu, August, 2005
- Minisymposium (Š. Nečasová) in the framework of International Conference on Continuum Mechanics, Evia, Greece, May 2006
- Minisymposium (Š. Nečasová, R. Rautmann, V. S. Solonnikov, J. Heywood) in the framework of World Congress of Nonlinear Analysis 2007

- Nonlinear PDE's to commemorate the work of Jindřich Nečas (14. 12. 1929 – 5. 12. 2002) together with M. Pokorný
- together with T. Bodnár organizer of minisymposia ECCOMAS CFD, 2010, Lisbon
- together with T. Bodnár : Summer school - Fluid-Structure Interaction for Biomedical Applications, August, 2011, Prague
- together with T. Bodnár and M. Pokorný: Summer School - Nonhomogeneous Fluids and Flow, August, 2012, Prague
- together with R. Rautmann (University of Paderborn) and W. Varnhorn (University of Kassel) organizers of minisymposia (*The Navier-Stokes Equations and Related Problems*) 9th AIMS conference, Orlando 2012
- together with E. Feireisl organizer of minisymposia (*Recent progress in the mathematical theory of compressible and incompressible fluid flows*), 9th AIMS conference, Orlando 2012
- together with R. Rautmann (University of Paderborn) and W. Varnhorn (University of Kassel) organizers of minisymposia (*The Navier-Stokes Equations and Related Problems*) 10th AIMS conference, Madrid 2014
- together with T. Bodnár (Czech Technical University) and G. P. Galdi (University of Pittsburgh) Summer school - Particles in Flows 25.8.2004 - 31.8.2014

- together with T. Bodnár (Czech Technical University) and G. P. Galdi (University of Pittsburgh) Summer school - Fluids under Pressure 29.8.2004 - 2.9.2014

Member of Scientific Council of Institute of Mathematics

Member of Editorial Board of:

- Differential Equations and Applications
- DCDS-S
- Atlantis Briefs in Differential Equations together with M. Pokorný (Charles University) and Z. Došlá (Masaryk University)

**Awards:**

2003 Wichterle prize - Prize of Academy of Sciences of the Czech Republic for young researcher

**Visiting positions:**

1993 - 1994 Postdoctoral Fellow, Department of Mathematics, University of Ferrara, Italy (Invited by Prof.Padula and Prof.Galdi)

1998, 2 months research position on the Northern Illinois University, 1998

1999 7 months research position, Institute Superior Tecnico, Lisbon, Portugal and CIM, Coimbra, Portugal (Invited by Prof.Sequeira)

2000 4 months as a visiting professor on University of Pittsburgh, Department of Mathematics

2002, 2011 visiting professor on University de Toulone et du Var

2003, 2006, 2007, 2010, 2014 Université de Pau et des Pays de l'Adour, France, visiting professor

2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 visiting position CEA

**Editorial work:**

- **Proceedings of Partial Differential Equations and Applications**, Olomouc 1999, in the occasion of the 70th anniversary of birthday of Prof. Nečas, edited by Š. Nečasová, H. Petzeltová, M. Pokorný, A. Sequeira
- **Special Issue Dedicated to Professor Vsevolod Aleksevich Solonnikov on the Occasion of his 75th Birthday**, Discrete and Continuous Dynamical Systems, S, 3, 2, June 2010, edited by Š. Nečasová, Reimund Rautmann and Werner Varnhorn
- **Special Issue Dedicated to Professor Vsevolod Aleksevich Solonnikov on the Occasion of his 75th Birthday**, Applicable Analysis: 90, 1, January 2011, 1-3, edited by Š. Nečasová, Reimund Rautmann, Roger Temam and Werner Varnhorn
- Jindřich Nečas, **Directed Methods in the Theory of Elliptic Equations** translated by G. Tronel and A. Kufner, editorial coordination by Š. Nečasová, contribution of C. Simader, Springer 2012
- **Fluid-Structure Interaction and Biomedical Applications**, Series Advances in Mathematical Fluid Mechanics, editors: T. Bodnár, G. P. Galdi, Š. Nečasová, 2014, Birkhauser Basel
- **Selected works of Jindřich Nečas**, edited by M. Pokorný, Š. Nečasová, V. Šverák, in Series Advances in Mathematical Fluid Mechanics, 2015 (publisher Birkhauser Basel)
- Archiv of Prof. J. Nečas ( together with A. Šolcová, J. Švecová)

- **Mathematical Models with Singularities**, *Author: Torres, Pedro J.*, **Atlantis Briefs in Differential Equations** - Springer, Editors: Došlá, Zuzana, Nečasová, Šárka, Pokorný, Milan
- **State-Dependent Impulses, Boundary Value Problems on Compact Interval**, *Authors: Rachůnková, Irena, Tomeček, Jan*, **Atlantis Briefs in Differential Equations** - Springer, Editors: Došlá, Zuzana, Nečasová, Šárka, Pokorný, Milan
- **Differential Equations with Involutions**, *Authors: Cabada, Alberto, F. Tojo, F. Adrián*, **Atlantis Briefs in Differential Equations** - Springer, Editors: Došlá, Zuzana, Nečasová, Šárka, Pokorný, Milan

#### Invited lectures at international conferences from 2010

- 1) **8th AIMS Conference on Dynamical Systems, Differential Equations and Applications**, 24.5.-28.5. 2010, Dresden *Global existence of solution for the one-dimensional motions of a compressible viscous gas with radiation*
- 2) **ECCOMAS CFD 2010**, 14.6.-17.6. 2010 *Theoretical aspects of motion of fluid around a rotating rigid body*
- 3) **Evolution equations**, Schmittgen, 10.10.-15.10. 2010 *On a model in radiation hydrodynamics*
- 4) **Trends in multi-scale analysis and homogenization**, 23.9.-25.9. 2010, CLUJ, *On the asymptotic limit of the Navier-Stokes system with rough boundary*
- 5) **Conference on Computer Methods in Mechanics**, 9.5.-12.5. 2011 *Boundary behaviour of viscous fluids*
- 6) **Spring school TH Darmstadt**, 28.2.-3.3. 2011 *On a some model of radiation*
- 7) **Vorticity, Rotation and Symmetry II**, Luminy, 22.5.-26.5. 2011 *On the motion of several rigid bodies in incompressible and compressible viscous fluids*

- 8) **International Conference on Mathematical Fluid Mechanics and Biomedical Applications**, Azores, Ponta Delgada, 30.5.–5.6. 2011 *On the motion of several rigid bodies in incompressible and compressible viscous fluids*
- 9) **Topics from the Theory of Navier- Stokes System**, Calais, March 22-23, 2012 *Weak solutions for the motion of a self-propelled deformable structure in a viscous incompressible fluid*
- 10) **Model reduction in continuum thermodynamics: Modeling, analysis and computation**, Banff, 16.9.- 22.9, Canada *Weak solutions to the barotropic Navier-Stokes system with slip boundary conditions in time dependent domains*
- 11) **Parabolic and Navier-Stokes equations**, Bedlewo, 4.9.- 7. 9, 2012 *Weak solutions to the barotropic Navier-Stokes system with slip boundary conditions in time dependent domains*
- 12) **Dynamical Systems, Differential Equations and Applications**, Orlando, 2012 *Weak solutions for the motion of a self-propelled deformable structure in a viscous incompressible fluid*
- 13) **Workshop on Navier-Stokes Equations**, Aachen, May 29.5.- 1.6. 2012 *Weak solutions to the barotropic Navier-Stokes system with slip boundary conditions in time dependent domains*
- 14) **Worshop on Complex Fluids**, 10.7 - 13.7. 2012, Darmstadt *Weak solutions for the motion of a self-propelled deformable structure in a viscous incompressible fluid*
- 15) **International Conference on the Mathematical Fluid Dynamics on the occasion of Prof. Shibata**, Nara, Japan, 5.3.–9.3.2013 *Compressible barotropic fluids in time-dependent domains:existence and incompressible limits.*
- 16) **Nonlinearities 2013**, 11.6.-15.6.2013, Male Ciche *Compressible barotropic fluids in time-dependent domains: existence and incompressible limits*



- 17) **Workshop on Navier-Stokes equations 21.5.- 24.5. 2013, Aachen**  
*Compressible barotropic fluids in time-dependent domains: existence and incompressible limits*
- 18) **SIAM meeting** , University of San Diego USA (July 2013) *Incompressible limits of fluids excited by moving boundaries*
- 19) **Mathematical Hydrodynamics and Parabolic Equations Steklov Institute**, San Petersburg (September 2013), *Low Mach number limit and diffusion limit in a model of radiative flow*
- 20) **EQUADIFF 2013** Praha, Czech Republic (August 2013) 2 lectures: *On the existence of weak solution to the coupled fluid-structure interaction problem for non-Newtonian shear-dependent fluid, Weak solutions for the motion of a self-propelled deformable structure in a viscous incompressible fluid*
- 21) **SIAM-PDE meeting**, Orlando, Florida (December 2013) *The motion of the rigid body in viscous fluid including collisions. Global solvability result*
- 22) **Recent Advances in PDEs and Applications**, Levico Terme, Italy (February 2014), *On the existence of weak solution to the coupled fluid-structure interaction*
- 23) **Compflows 2014** Bedlewo, Poland (March 2014) *Low Mach number limit and diffusion limit in a model of radiative flow*
- 24) **Vorticity, Rotation and Symmetry** Luminy, France (May 2014) *Low Mach number and diffusion limit for a radiative flow*
- 25) **10th AIMS Conference Madrid**, Spain (July 2014) *Linearized stationary incompressible flow around rotating and translating body-Leray solution, asymptotic profile*
- 26) **Conference on PDE**, Novacella, Italy (May 2014), *On the low Mach number limit and diffusion limit in a model of radiative flow*
- 27) **Classical Problems and New Trends in Mathematical Fluid Dynamics**, Ferrara, Italy (September 2014), *Low Mach number limit and diffusion limit in radiation hydrodynamics*

- 28) **Mathematical Fluid Dynamics** - Autumm School and Workshop organized by TH Darmstadt, Bad Boll (October 2014), *Low Mach number limit and diffusion limit on the model of radiative flow*
- 29) **Workshop on PDE's and Biomedical Applications**, Lisbon, Portugal (December 2014), *Diffusion limit in a model of radiative flow*
- 30) **BIO Fluids**, Warsaw, Poland (April 2015), *Singular limits in a model of radiative fluid*
- 31) **SMAIS**, Karellis, France (June 2015), *Singular limis in radiation flow*
- 32) **Asymptotic problems: Elliptic and Parabolic Issues**, Vilnius, Lithuania (June 2015), *Inviscid incompressible limits on expanding domains*
- 33) **Singular PDEs, Analytical Tools and Application**, Male Ciche, Poland (June 2015), *Diffusion and low Mach number limits in a model of radiative flow*
- 34) **Equadiff 2015**, Lyon, France (July 2015), *Inviscid incompressible limits on expanding domains*
- 35) **Modelling and Analysis of Problems in Continuum Mechanics, Kassel, Germany (September 2015)**, *On the problem of singular limit in a Navier-Stokes-Fourier model coupled with the transport of radiative intensity*
- 36) **Multiscale simulation methods for soft matter systems, Mainz, Germany (October 2015)**, *On the problem of singular limit in a Navier-Stokes-Fourier model with radiation*
- 37) **Mathematical Fluid Mechanics, Old problems, New Trends- A week for Wojciech Zajackowski**, Bedlewo, Poland (August 2015), *Inviscid incompressible limits on expanding domains*
- 38) **The Navier-Stokes Equations and Related Topics**, Nagoya, Japan, *The problem of dynamics of a self-propelled deformable body in viscous compressible fluid and the dynamics of rigid body with a cavity filled by a viscous compressible fluid*

39) **First Chinese Czech Conference on Mathematical Fluid Mechanics, September, 2016**, *On the problem of rotating compressible fluids on thin domains*

40) **Conference in honor of Hi Ju Choe, May 2016**, *Derivation of the Navier-Stokes(-Fourier)-Poisson system for an accretion disk*

41) **Workshop on Nonlinear Mechanics and Applications in Life Sciences, October, 2016**, *Rigorous derivation of the equations describing objects called "accretion"*

42) **Workshop on mathematical fluid dynamics, Darmstadt, Germany, November 2016**, *The motion of a rigid body in a viscous fluid*

#### **Invited lectures at international universities from 2010**

1) TH Hamburg, 2.2.-5.2.2010, *On the motion of fluid of several rigid bodies in an incompressible non-Newtonian fluids*

2) TU Darmstadt, 7.11.-12.11.2010, *On pointwise decay of linearized stationary incompressible viscous flow around rotating and translating body*

3) Université de Pau, 28.6.2010, habilitation lecture *Mathematical modelling of fluid mechanics*

4) University of TH Dresden, 23.6.-24.6.2011, *Mathematical aspects on the motion of fluid around rotating body and motion of several rigid bodies in fluid*

5) University of Oxford, 5.5.- 11.5.2013, *Compressible barotropic fluids in time-dependent domains: existence and incompressible limits*

6) University of Nanjing, 12.10. – 18.10.2013, *Existence and singular limits for compressible fluids on moving domains*

7) University in Beijing, 18.10.-20.10.2013, *Weak solutions of deformable body*

8) Univ. of Chambéry, 10.6.– 12.6.2015, *Singular limits in radiation flow*

9) University of Oregon, 12.10.– 16.10.2015, *The motion of fluid around moving rigid body*

40) University of Austin, 18.10.– 21.10.2015, *On the problem of singular limit of the Navier - Stokes- Fourier system with radiation* 41) University of Ohio,

March 2016, *On the problem of singular limit of the Navier-Stokes-Fourier system coupled with radiation or with electromagnetic field*

## **Research Projects**

### **Proposer**

- **Grant Agency of Academy of Sciences**

- Mathematical modelling of motion of bodies in Newtonian and non-Newtonian fluids and related mathematical problems 2005–2007
- The motion of rigid bodies in fluids: mathematical analysis, numerical simulation and related problems 2008–2010

- **DAAD projekt (Czech-German)**

- 2005-2006 together with Prof. R. Farwigem (TU Darmstadt)
- 2009-2010 together with Prof. R. Farwigem (TU Darmstadt)

- **Barrande project (Czech-France)** 2003-2004 together with Prof. Sokolowski (Univ. of Nancy)

- **CNRS projekt** 2007-2008 together with Prof. Sokolowski (Univ. of Nancy)

- **Common project between Academy of Sciences of Czech Republic and Ukraine** 2008-2009, 2010-2012 together with Prof. I. Skrypnik (Univ. of Donetsk)

- **Grant Agency of the Czech Republic**

- 2011-2013 Motion of fluids in domains with varying geometry

- 2016-2018 Thermodynamically consistent models for fluid flows: mathematical theory and numerical solution

## Scientometry

- 130 items registered by MathSciNet
- 638 citations by 270 authors

# 1 List of publications from 2010

## 1.1 Book

Š. Nečasová, S. Kračmar: Navier-Stokes Flow Around a Rotating Obstacle: Mathematical Analysis of its Asymptotic Behavior. Atlantis Press, Paris, 2016.

## 1.2 Chapters in monographs

1. **E. Feireisl, Š. Nečasová.** *The effective boundary conditions for vector fields on domains with rough boundaries.* Applications to fluid mechanics, Special volume dedicated to Prof. V. A. Solonnikov, Application of Mathematics **56**, 1, 39–49, 2011.

2. **Y. V. Namlyeyeva, Š. Nečasová, I. Skypnik.** *The Dirichlet problems for steady Navier-Stokes equations in domains with thin channels.* Advances in Mathematical Fluid Mechanics 1 (ed. A. Sequeira, R. Rannacher). Heidelberg: Springer, 2010, s. 339–366. ISBN 978-3-642-04067-2

3. **E. Feireisl, Š. Nečasová.** *On the long-time behavior of a rigid body immersed in a viscous fluid.* Special volume dedicated to Prof. V. A. Solonnikov, Applicable Analysis, **90**, 1, 59–66, 2011.

4. **P. Deuring, S. Kračmar, Š. Nečasová.** *A representation formula for linearized stationary incompressible viscous flows around rotating and translating bodies.* Special Volume dedicated to Prof. V. S. Solonnikov, DCDS serie S, **3**, 2, 237–254, 2010.

5. **B. Ducomet, Š. Nečasová.** *Global weak solutions to the 1D compressible Navier-Stokes equations with radiation.* Communications in Mathematical Analysis, **8**, 2, 23–65, Special Volume in Honor of Prof. P. Lax, 2009
6. **B. Ducomet, Š. Nečasová.** *On the motion of several rigid bodies in an incompressible viscous fluid under the influence of selfgravitating forces.* Progress in Nonlinear Differential Equations and Their Applications, Dedicated to Prof. Amann, **80**, 167–192, 2011.

### 1.3 List of articles published in scientific journals

1. **D. Bucur, E. Feireisl, Š. Nečasová.** *Boundary behavior of viscous fluids: Influence of wall roughness and friction-driven boundary conditions,* Arch. Rat. Mech. Anal., **197**, 1, 117–138, 2010.
2. **L. Consiglieri, Š. Nečasová, J. Sokolowski.** *New approach to the incompressible Maxwell-Boussinesq approximation: Existence, uniqueness and shape sensitivity,* J. Diff. Equ., **249**, 12, 3052–3080, 2010.
3. **B. Ducomet, Š. Nečasová, A. Vasseur.** *On spherically symmetric motions of a viscous compressible barotropic and selfgravitating gas,* J. of Math. Fluid Mech., **13**, 2, 191–211, 2011.
4. **B. Ducomet, Š. Nečasová, A. Vasseur** *On global motions of a compressible barotropic and selfgravitating gas with density-dependent viscosities,* Z. Angew. Math. Phys. Phys., **61**, 3, 479–491, 2010.
5. **B. Ducomet, Š. Nečasová.** *Thermalization in a model of neutron star,* DCDS ser. B **16**, 3, 801–818, 2011.
6. **C. Amrouche, Š. Nečasová, Y. Raudin** *From strong to very weak solution to the Stokes system with Navier boundary conditions in  $R_+^n$ ,* SIAM J. Math. Anal. **41**, 5, 1792–1815, 2010.
7. **B. Ducomet, Š. Nečasová.** *Global existence of solutions for the one-dimensional motions of a compressible viscous gas with radiation: and "infra-relativistic model",* Nonlinear Analysis, **72**, 7-8, 3258–3274, 2010.

8. **P. Deuring, S. Kračmar, Š. Nečasová.** *On pointwise decay of linearized stationary incompressible viscous flow around rotating and translating bodies*, SIAM J. Math. Anal., **43**, 2, 705–738, 2011.
9. **R. Farwig, Š. Nečasová, J. Neustupa.** *Spectral Analysis of a Stokes-Type Operator Arising from Flow around a Rotating Body*, J. of Math. Soc. of Japan, **63**, 1, 163–194, 2011.
10. **Š. Nečasová.** *On the motion of several rigid bodies in an incompressible non-Newtonian and heat-conducting fluid*, Ann. Univ. Ferrara, **55**, 325–352, 2009.
11. **I. Denisova, Š. Nečasová.** *The Oberbeck-Boussinesq approximation for the motion of two incompressible fluids*. J. Math. Sci., 159, **4**, 436–451, 2009.
12. **P. Deuring, S. Kračmar and Š. Nečasová.** *Linearized stationary incompressible flow around rotating and translating bodies: asymptotic profile of the velocity gradient and decay estimate of the second derivatives of the velocity*, J. of Diff. Eq., **252**, 1, 459–476, 2012.
13. **B. Ducomet, Š. Nečasová.** *Large- time behavior of the motion of a viscous heat-conducting one dimensional gas coupled to radiation*, Annali di Matematica Pura ed Applicata, **191**, 219–260, 2012.
14. **B. Ducomet, Š. Nečasová.** *Asymptotic behavior of the motion of a viscous heat-conducting one dimensional gas with radiation: the pure scattering case* Analysis and Applications, 11 (1), 2013.
15. **B. Ducomet, E. Feireisl, Š. Nečasová.** *On a model in radiation hydrodynamics*, Annales de l’IHP Analyse Non Lineaire, **28**, 6, 797–812, 2011.
16. **S. Kračmar, D. Medková, Š. Nečasová, W. Varnhorn.** *A maximum modulus theorem for the Oseen problem*, Annali di Matematica Pura ed Applicata, **4**, 192, 6, 1059–1076, 2013.
17. **Š. Nečasová, T. Takahashi, M. Tucsnak.** *Weak solutions for the motion of a self-propelled deformable structure in a viscous incompressible fluid*,. Acta Appl. Math., **116**, 3, 329–352, 2011.

18. **B. Ducomet, Š. Nečasová.** *On the motion of rigid bodies in a incompressible or compressible viscous fluid under the action of gravitational forces*, DCDS S 6 (5), 2013, 1193–1213.
19. **O. Kreml, Š. Nečasová, M. Pokorný.** *On the steady equations for compressible radiative gas* submitted to Zeitschrift fuer Angewandte Mathematik und Physik 64 (3), 2013, 539-5
20. **E. Feireisl, O. Kreml, Š. Nečasová, J. Neustupa, J. Stebel.** *Compressible fluids in time-dependent domain with slip boundary condition*, Journal of Differential Equations 254 (1), 2013, 125–140.
21. **B. Ducomet, Š. Nečasová .** *On the 2D compressible Navier–Stokes system with density-dependent viscosities* Nonlinearity 26 (6), 2013, 1783–1797
22. **P. Deuring, S. Kračmar, Š. Nečasová.** *Pointwise decay of stationary rotational viscous incompressible flows with nonzero velocity at infinity*, J. Differential Equations 255 (2013), no. 7, 1576–1606.
23. **R. Farwig, R. B. Guenther, Š. Nečasová, E. A. Thomann.** The fundamental solution of linearized nonstationary Navier-Stokes equations of motion around a rotating and translating body, DCDS - A 34 (2014), no. 2, 511–529.
24. **A. Mikelić, Š. Nečasová, M. Neuss-Radu.** Effective slip law for general viscous flows over an oscillating surface, Math. Methods and Appl. Sciences 36 (2013), no. 15, 2086–2100.
25. **B. Ducomet, Š. Nečasová.** Global smooth solution of the Cauchy problem for a model of a radiative flow, Annali della Scuola Normale Superiore di Pisa (5) 14 (2015), no. 1, 1–36.
26. **B. Ducomet, Š. Nečasová.** Global smooth solution of the Cauchy problem for a model of radiative flow, J. Math. Anal. Appl. 420 (2014), no. 1, 464—482.
27. **E. Feireisl, O. Kreml, Š. Nečasová, J. Neustupa, J. Stebel.** Incompressible limits of fluids excited by moving boundaries, SIAM J. Math. Anal. 46 (2014), no. 2, 1456—1471.



28. **P. Deuring Paul, S. Kračmar, Š. Nečasová.** Linearized stationary incompressible flow around rotating and translating bodies- Leray solution, *Discrete Contin. Dyn. Syst. Ser. S* 7 (2014), no. 5, 967—979.
29. **Š. Nečasová, J. Wolf.** On the linear problem arising from motion of fluid around moving rigid body, *Math. Bohem.* 140 (2015), no. 2, 241—259.
30. **B. Ducomet, Š. Nečasová.** Diffusion limits in a model of radiative flow, *Ann. Univ. Ferrara Sez. VII Sci. Mat.* 61 (2015), no. 1, 17—59.
31. **B. Ducomet, Š. Nečasová.** On a model in incompressible radiation hydrodynamics, *Math. Methods Appl. Sci.* 38 (2015), no. 4, 765—774.
32. **B. Ducomet, Š. Nečasová.** Low Mach number limit for a model of radiative flow, *J. Evol. Equations* 14 (2014), no. 2, 357—385.
33. **C. Amrouche, M. Meslamemi, Š. Nečasová.** Linearized Navier-Stokes equations in  $R^3$ : An Approach in Weighted Sobolev Spaces, *Discrete Contin. Dyn. Syst. Ser. S* 7 (2014), no. 5, 901—916.
34. **C. Amrouche, M. Meslamemi, Š. Nečasová.** Uniqueness and regularity for the Oseen equations in an exterior domain, *J. Differential Equations* 256 (2014), no. 6, 1955—1986.
35. **S. Kraňar, Š. Nečasová, P. Penel.** A certain weighted variant of the embedding, *C. R. Math. Acad. Sci. Paris* 351 (2013), no. 17-18, 663—668.
36. **A. Hundertmark - Zaušková, M. Lukáčová - Medvidová, Š. Nečasová.** On the existence of weak solution to the coupled fluid-structure interaction problem for non-Newtonian shear dependent fluid, *J. of Math. Soc. of Japan* 68 (2016), no. 1, 193—243.
37. **S. Kračmar, Š. Nečasová, A. Novotný.** The motion of a compressible viscous fluid around rotating body, *Ann. Univ. Ferrara Sez. VII Sci. Mat.* 60 (2014), no. 1, 189—208.
38. **V. Mácha, Š. Nečasová.** Self-propelled motion in a viscous compressible fluid, Accepted in *Proc. of Royal Soc. of Edinburgh A* 146 (2016), no. 2, 415—433.

39. **S. Kračmar, M. Krbec, Š. Nečasová, P. Penel, K. Schumacher.** Very weak solutions to the rotating Stokes, Oseen and Navier-Stokes problems in weighted space, *Math. Nachr.* 289 (2016), no. 11-12, 1466–1487.
40. **Š. Nečasová, J. Wolf.** On the existence of global strong solutions to the equations modeling a motion of a rigid body around a viscous fluid, *Discrete and Continuous Dynamical Systems - Series A* 36 (3), 2016, 1539–1562.
41. **M. Lukáčová - Medvidová, H. Mizerová, Š. Nečasová.** Global existence and uniqueness result for the diffusive Peterlin viscoelastic model, *Nonlinear Analysis: Theory, Methods and Applications* 120, 2015, 154–170.
42. **B. Ducomet, Š. Nečasová.** Non-relativistic limit in a model of radiative flow, *Analysis* 35 (2), 2015, 117–137.
43. **B. Ducomet, Š. Nečasová.** Singular limits in a model of radiative flow *Journal of Mathematical Fluid Mechanics* 17 (2), 2015, 341–380.
44. **E. Feireisl, Š. Nečasová, Y. Sun.** Inviscid incompressible limits on expanding domains, *Nonlinearity* 27 (10), 2014, 2465–2477.
45. **V. Mácha, Š. Nečasová.** Self-propelled motion in a viscous compressible fluid –unbounded domains, *Mathematical Models and Methods in Applied Sciences* 26 (2016), no. 4, 627–643.
46. **X. Blanc, B. Ducomet, Š. Nečasová.** On some singular limits in damped radiation hydrodynamics, *J. of Hyper. Diff. Equations* 13 (2016), no. 2, 249–271.
47. **C. Grandmont, M. M. Lukáčová - Medvidová, Š. Nečasová.** Mathematical and numerical analysis of some FSI problems. Fluid-structure interaction and biomedical applications, 1—77, *Adv. Math. Fluid Mech.*, Birkhäuser/Springer, Basel, 2014.
48. **E. Feireisl, Y. Namlyeyeva, Š. Nečasová.** Homogenization of the evolutionary Navier-Stokes system, *Manuscripta Mathematica*, 149 (2016), no. 1-2, 251—274.
49. **P. Deuring, S. Kračmar, Š. Nečasová** Leading terms of velocity and its gradient of the stationary rotational viscous incompressible flows with nonzero velocity at infinity, Accepted in *DCDS A*.

50. **P. Deuring, S. Kračmar, Š. Nečasová.** Asymptotic structure of viscous incompressible flow around a rotating body, with nonvanishing flow field at infinity, *Z. Angew. Math. Phys.* 68 (2017), no. 1, 68:16,
51. **O. Kreml, V. Mácha, Š. Nečasová, A. Wroblewska-Kaminska.** Weak solutions to the full Navier-Stokes-Fourier system with slip boundary conditions in time dependent domains, Accepted in *J. of Math Pures et Applique*.
52. **P. Deuring, S. Kračmar, Š. Nečasová.** Note to the problem of asymptotic behavior of viscous incompressible flow around a rotating body, *C. R. Math. Acad. Sci. Paris* 354 (2016), no. 8, 794–798.
53. **B. Ducomet, M. Kobera, Š. Nečasová.** Global existence of a weak solution for a model in radiation magnetohydrodynamic, Accepted in *Acta Applicandae Mathematicae*.
54. **E. Feireisl, O. Kreml, V. Mácha, Š. Nečasová.** On the low Mach number limit of compressible flows in exterior moving domains, *J. of Evol. Equations* 16 (2016), no. 3, 705–722.
55. **N. Chemetov, Š. Nečasová.** The motion of the rigid body in the viscous fluid including collisions. Global solvability result. *Nonlinear Anal. Real World Appl.* 34 (2017), 416—445.

## 1.4 List of articles published in reviewed proceedings

1. **P. Deuring, S. Kračmar, Š. Nečasová.** *A linearized system describing stationary incompressible viscous flow around rotating and translating bodies: improved decay estimates of the velocity and its gradient*, Discrete and Continuous Dynamical System- Supplements 2011, Dynamical Systems, Differential Equations and Applications, eds. W. Feng, Z. Feng, M. Grasselli, A. Ibragimov, X. Lu, S. Siegmund
2. **B. Ducomet, Š. Nečasová.** *On the motion of rigid bodies in a compressible viscous fluid under the action of gravitational forces*, Applications of Mathematics in Proceedings of the Applications of Mathematics 2012, Prague, 2.5.2012 - 5.5.2012, editor(s): Brandts, J. - Chleboun, J. - Korotov, S.

- Segeth, K. - Šístek, J. - Vejchodský, T., Proceedings of the International Conference Applications of Mathematics 2012, Institute of Mathematics AS CR, Prague, 2012, 83-98.

## 1.5 List of articles submitted to the reviewed journals

1. **B. Ducomet, Š. Nečasová.** Non equilibrium diffusion limit in a barotropic radiative flow, Submitted to Proceedings of AMS
2. **E. Feireisl, M. Medvid'ová-Lukáčová, Š. Nečasová, A. Novotný, B. She** Asymptotic preserving error estimates for numerical solutions of compressible Navier-Stokes equations in the low Mach number regime, Submitted to SIAM J. on Multiscale Modeling and Simulation
3. **B. Ducomet, M. Caggio, Š. Nečasová, M. Pokorný** The rotating Navier-Stokes-Fourier-Poisson system on thin domains, Submitted to Acta Applicandae Mathematicae
4. **E. Feireisl, V. Mácha, Š. Nečasová, M. Tucsnak** Analysis of the adiabatic piston problem via methods of continuum mechanics, Submitted to Ann. Inst. H. Poincaré Anal.
5. **D. Donatelli, B. Ducomet, Š. Nečasová** Low Mach number limit for a model of accretion disk, Submitted to Nonlinearity
6. **M. Lukáčová - Medvid'ová, H. Mizerová, Š. Nečasová, M. Renardy,** Global existence result for the generalized Peterlin viscoelastic model, Submitted to SIAM

## 2 Other scientific works

D1 - **Phd thesis** - Quantitative and qualitative properties of equations describing the motion of fluids and their numerical solution

D2 - **Habilitation à Diriger des Recherches del'Université de Pau et des Pays de l'Adour**, 2010, *On the mathematical aspects of the motion of fluid : fluid-structure interaction, compressible fluids, motion of fluid in oscillating domain, shape sensitivity analysis, boundary conditions*

D3- DSc. Habilitation, 2013, *Mathematical analysis of the motion of viscous fluids: motion of incompressible fluid around rotating and translating rigid body, motion of compressible gas, motion of linear viscous fluid in the half space*