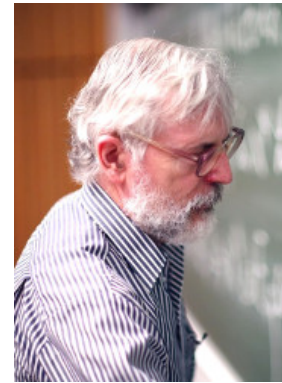


Jens Frehse



Academic career

1966 - 1969	Assistant Professor, University of Frankfurt
1969 - 1970	Postdoc, National Research Council (CNR), Rome, Italy
1970	Habilitation, University of Frankfurt
1972	DFG research, Pisa, Italy
1972 - 1973	Substitution Professor (C4), University of Heidelberg
1973	Visiting Associate Professor, University of California, Berkeley, CA, USA
1973 - 2010	Professor (C4), University of Bonn
Since 2010	Professor Emeritus, University of Bonn

Honours

1992	French-German Humboldt Award
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Offers

1980	Offer of a Chair in Mathematics, FU Berlin
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Invited Lectures

1994	Paseky, Czech Republic
2004 - 2010	Prague, Czech Republic

Research Projects and Activities

DFG Collaborative Research Center SFB 611 "Singular Phenomena and Scaling in Mathematical Models"

Project leader (with S. Conti), "Analysis von Multikomponentensystemen"

DAAD Project "Stochastic Differential Games and Partial Differential Systems in Financial Markets", Exchange program Hong Kong/Bonn

"Regularity theory for nonlinear elliptic and parabolic differential equations"

"Stationary compressible fluids"

"Long time behaviour of p-fluids"

"Regularity analysis for elastic perfect plastic deformations"

Research profile

Mainly I consider myself as a specialist in regularity theory in the field of nonlinear elliptic and parabolic equations and variational inequalities. Besides the classical meaning, "regularity" may also mean "improved p-integrability" or "improved fractional differentiability" in situations where more regularity cannot be obtained (e.g. see my work on compressible fluids and elastic-plastic deformation with hardening). The equations considered come from continuum mechanics, fluid mechanics, Bellmann system to stochastic games. Euler equations to variational problems motivated by differential geometry. In the last two years, I developed, in collaboration with Miroslav Bulicek, several new weighted norm techniques which allow to treat a considerable broader class of variational problems with p-growth, and also stochastic differential games like Stackelberg games rather than Nash games. These techniques will be applied in the framework of mean field games in the sense of Lasry-Lions, furthermore for proving the long time existence of certain variational flows. A recent manuscript on the Prandtl Reuss problem (submitted) yields a new technique to obtain fractional derivatives of stress velocities. This improves the regularity theory of related problems in several directions.

Editorships

- Asymptotic Analysis
- Zeitschrift Angewandte Analysis
- Differential Equations and Nonlinear Mechanics

Research Area B

Supervised theses

Diplom theses currently: 1

PhD theses currently: 1

Selected PhD students

Liubov Khasina (2008): “Mathematische Behandlung von Mischungen elastoplastischer Substanzen”

Igor Huft (2008): “Einbettungen von logarithmischen Morrey-Räumen”

Dominique Löbach (2010): “Regularity analysis for problems of elastoplasticity with hardening”

Thomas Buch

Habilitations

No habilitations in the last period.

Over 10 during my work at the university.

Selected publications

- [1] Alain Bensoussan, Dominic Breit, and Jens Frehse. Parabolic bellman-systems with mean field dependence. *Appl. Math. Optim.*, 73(3):419–432, 2016.
- [2] Lisa Beck, Miroslav Bulíček, and Jens Frehse. Old and new results in regularity theory for diagonal elliptic systems via blowup techniques. *J. Differential Equations*, 259(11):6528–6572, 2015.
- [3] Alain Bensoussan, Jens Frehse, and Christine Grün. On a system of pdes associated to a game with a varying number of players. *Commun. Math. Sci.*, 13(3):623–639, 2015.
- [4] Miroslav Bulíček, Jens Frehse, and Mark Steinhauer. On hölder continuity of solutions for a class of nonlinear elliptic systems with p-growth via weighted integral techniques. *Ann. Mat. Pura Appl. (4)*, 194(4):1025–1069, 2015.
- [5] Jens Frehse and Sebastian Schwarzacher. On regularity of the time derivative for degenerate parabolic systems. *SIAM J. Math. Anal.*, 47(5):3917–3943, 2015.
- [6] Miroslav Bulíček and Jens Frehse. C^α -regularity for a class of non-diagonal elliptic systems with p-growth. *Calc. Var. Partial Differential Equations*, 43(3-4):441–462, 2012.
- [7] J. Frehse, M. Steinhauer, and W. Weigant. The dirichlet problem for steady viscous compressible flow in three dimensions. *J. Math. Pures Appl. (9)*, 97(2):85–97, 2012.
- [8] Miroslav Bulíček and Jens Frehse. On nonlinear elliptic bellman systems for a class of stochastic differential games in arbitrary dimension. *Math. Models Methods Appl. Sci.*, 21(1):215–240, 2011.
- [9] J. Frehse, M. Steinhauer, and W. Weigant. On stationary solutions for 2-d viscous compressible isothermal navier-stokes equations. *J. Math. Fluid Mech.*, 13(1):55–63, 2011.
- [10] J. Frehse, M. Steinhauer, and W. Weigant. The dirichlet problem for viscous compressible isothermal navier-stokes equations in two dimensions. *Arch. Ration. Mech. Anal.*, 198(1):1–12, 2010.
- [11] Jens Frehse, Josef M’alek, and Michael Ruzicka. Large data existence result for unsteady flows of inhomogeneous shear-thickening heat-conducting incompressible fluids. *Comm. Partial Differential Equations*, 35(10):1891–1919, 2010.
- [12] Jens Frehse and Maria Specovius-Neugebauer. Morrey estimates and hölder continuity for solutions to parabolic equations with entropy inequalities. *J. Reine Angew. Math.*, 638:169–188, 2010.