Conference: Mathematical Modelling in Metallurgical Industry, 17.-18.9. 2018, Kristiansand

European Collaboration in Industrial and Applied Mathematics

Prof. Dr. Dietmar Hömberg, Weierstrass Institute, Berlin, and Mathematical Sciences, NTNU

Dietmar Hömberg is head of the research group for Nonlinear Optimization and Inverse Problems at The Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin. The research group is concerned with problems in optimization and optimal control as well as inverse problems regarding up-to-date technical and economical applications. Research tasks range from theoretical questions regarding analysis and numerics of these problems to the development of efficient numerical algorithms and software to the point of the solution of application problems. In their research, the group touches almost all main application topics of the WIAS and concentrates on the topics

- stochastic and non-smooth optimization
- inverse problems for random surfaces and data
- optimal control of multi-field and multi-scale problems

He also has a part time position at Department of Mathematical Sciences at The Norwegian University of Science and Technology (NTNU), Trondheim.

In the first part of his presentation, Dietmar Hömberg will give an overview of recent activities of the mathematics community for a European collaboration in Industrial and Applied Mathematics. Mission and interaction of key institutions like European Consortium for Mathematics in Industry (ECMI) and European Service Network of Mathematics for Industry and Innovation (EU-MATHS-IN) will be reviewed, as well as funding opportunities for collaboration between math and industry in Horizon 2020 with a special emphasis on Cost Actions and Marie Sklodowska Curie projects.

In the second part of his talk, he will present some scientific results from the European Industrial Doctorate network “MIMESIS- Mathematics and Materials Science for Steel Production and Manufacturing” related to induction heating problems. The common basis is a multi-field model coupling a diffusive Maxwell system in time domain with the energy balance. He will address questions regarding qualitative analysis of the coupled system and an efficient numerical treatment and conclude with some numerical results related to steel manufacturing.

Curriculum vitae: Dietmar Hömberg

1 Personal

Date of birth:	12.8.1961
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2 Academic qualifications

1988	Diploma, University of Münster
1993	Ph.D. University of Essen
2002	Habilitation, Technische Universität Berlin

3 Employment

1988–1994	Research assistent, University of Essen
1994–2003	Research associate, WIAS Berlin
since 2003	Full professor, Technische Universität Berlin and head of research group “Nonlinear Optimization and Inverse Problems” of WIAS
since 2014	adjunct professor, Norwegian University of Science and Technology, Trondheim

4 Fields of interest

- phase transitions
- optimal control of PDEs
- optimal shape design
- nonlinear optimization

5 Functions in scientific organizations, scientific service

- President European Consortium for Mathematics in Industry (ECMI), 2016–2017

- Head of new ECMI Special Interest Group on 'Digital Factories'
- Member of 7th Technical Committee (TC7) of the International Federation for Information Processing (IFIP) on System Modeling and Optimization
- Vice chair of Cost Action TD1409 (Mi-NET)
- Scientist in Charge of Application Area 'Energy and Materials' of Research Center MATHEON – Mathematics for key technologies

6 Selected publications

1. Hömberg, D., Meyer, Ch., Rehberg, J., Ring, W.: Optimal control for the thermistor problem, SIAM J. Control Optim., 48 (2010), 3449–3481.
2. Chełminski, K., Hömberg, D., Rott, O.: On a thermomechanical milling model, Nonlinear Anal. Real World Appl., 12 (2011), 615–632.
3. Hömberg, D., Liu, J., Togobytska, N.: Identification of the thermal growth characteristics of coagulated tumor tissue in laser-induced thermotherapy, Math. Methods Appl. Sci., 35 (2012), 497–509.
4. Hömberg, D., Krumbiegel, K., Rehberg, J.: Boundary coefficient control — A maximal parabolic regularity approach, Appl. Math. Optim., 67 (2013), 3–31.
5. Hömberg, D., Lu, S., Sakamoto, K., Yamamoto, M.: Parameter identification in nonisothermal nucleation and growth processes, Inverse Problems, 30 (2014), 035003/1–035003/24.