Annual Meeting of the Second Phase of the DFG Priority Programme 1962

Non-smooth and Complementarity-based Distributed Parameter Systems: Simulation and Hierarchical Optimization

March 24th–25th, 2021

DFG Deutsche Forschungsgemeinschaft

WIAS

Coordinator:

Prof. Dr. M. Hintermüller

Organization committee:

Dr. A. Alphonse

Steering committee:

Prof. Dr. M. Heinkenschloss

Prof. Dr. R. Herzog

Prof. Dr. M. Hintermüller

Prof. Dr. B. Kaltenbacher

Prof. Dr. M. Ulbrich

List of Projects

P1: Approximation of Non-Smooth Optimal Convex Shapes with Applications in Optimal Insulation and Minimal Resistance

S. Bartels, G. Wachsmuth — H. Keller

P2: Multiobjective Optimization of Non-Smooth PDE-Constrained Problems — Switches, State Constraints and Model Order Reduction

M. Dellnitz, S. Volkwein, S. Peitz — M. Bernreuther, B. Gebken, G. Müller

P3: Bilevel Optimal Control: Theory, Algorithms, and Applications

G. Wachsmuth, S. Dempe — P. Mehlitz, M. Friedemann, F. Harder

P4: Identification of Stresses in Heterogeneous Contact Models

G. Duda, A. Schiela, M. Weiser — F. Baumann

P5: Multiscale Control Concepts for Transport-Dominated Problems

S. Göttlich, M. Banda, M. Herty — A. Thünen, G. Weldegiyorgis

P6: A Calculus for Non-Smooth Shape Optimization with Applications to Geometric Inverse Problems

R. Herzog, S. Schmidt — M. Weiß, L. Baumgärtner

P8: A Non-Smooth Phase-Field Approach to Shape Optimization with Instationary Fluid Flow

M. Hintermüller, M. Hinze — P. J. Herbert

P9: Constrained Mean Field Games: Analysis and Algorithms

M. Hintermüller, T. Surowiec — S. Essadi

P10: A Unified Approach to Optimal Uncertainty Quantification and Risk-Averse Optimization with Quasi-Variational Inequality Constraints

M. Hintermüller — A. Alphonse

P11: Optimization Problems in Banach Spaces with Non-Smooth Structure

C. Kanzow, D. Wachsmuth — X. Jia, C. Natemeyer

P12: Non-Smooth Methods for Complementarity Formulations of Switched Advection-Diffusion Processes

C. Kirches, S. Sager, S. Leyffer

P13: Simulation and Optimization of Rate-Independent Systems with Non-Convex Energies

D. Knees, C. Meyer — S. Thomas

P14: Bilevel Optimal Transport

D. Lorenz, C. Meyer — S. Hillbrecht, H. Mahler

P15: Optimizing Fracture Propagation using a Phase-Field Approach

I. Neitzel, T. Wick, W. Wollner — N. Simon

P16: Nonsmooth Multi-Level Optimization Algorithms for Energetic Formulations of Finite-Strain Elastoplasticity

O. Sander, A. Schiela — P. Jaap

P17: Nonsmooth and Nonconvex Optimal Transport Problems

B. Schmitzer, B. Wirth — J. Lohmann

P18: Shape Optimization for Mitigating Coastal Erosion

V. Schulz, D. Seck — L. Schlegel

P19: Semi-Smooth Newton Methods on Shape Spaces

V. Schulz, K. Welker — N. Baloumis

P20: Stress-Based Methods for Variational Inequalities in Solid Mechanics: Finite Element Discretization and Solution by Hierarchical Optimization

G. Starke, R. Krause — B. Kober

P21: Theory and Solution Methods for Generalized Nash Equilibrium Problems Governed by Networks of Nonlinear Hyperbolic Conservation Laws

S. Ulbrich, M. Ulbrich — M. Steinhardt, J. Wachter

P22: Multi-Physics Phenomena in High-Temperature Superconductivity: Analysis, Numerics and Optimization

I. Yousept — M. Winckler

Program

Zoom link: `https://us02web.zoom.us/j/88582486834?pwd=NkRwTU51cjNSNzZlM0JTekxLOWc4dz09`

Wednesday, Mar 24

9:00 - 9:15		Welcome and opening remarks (M. Hintermüller)
		Chair: O. Sander
9:15 - 9:40	P6	A Calculus for Non-Smooth Shape Optimization with Applications to Geometric Inverse Problems (L. Baumgärtner)
9:40 - 10:05	P5	Multiscale Control Concepts for Transport-Dominated Problems (S. Göttlich, A. Thünen)
10:05 - 10:30	P13	Simulation and Optimization of Rate-Independent Systems with Non-Convex Energies (M. Sievers)
10:30 - 10:40		Break
		Chair: S. Bartels
10:40 - 11:05	P4	Identification of Stresses in Heterogeneous Contact Models (F. Baumann)
11:05 - 11:30	P22	Multi-Physics Phenomena in High-Temperature Superconductivity: Analysis, Numerics and Optimization (M. Winckler)
11:30 - 11:55	P12	Non-Smooth Methods for Complementarity Formulations of Switched Advection-Diffusion Processes (C. Kirches)
11:55 - 13:00		Lunch
		Chair: I. Neitzel
13:00 - 13:25	P16	Nonsmooth Multi-Level Optimization Algorithms for Energetic Formulations of Finite-Strain Elastoplasticity (P. Jaap)
13:25 - 13:50	P20	Stress-Based Methods for Variational Inequalities in Solid Mechanics: Finite Element Discretization and Solution by Hierarchical Optimization (B. Kober)
13:50 - 14:15	P14	Bilevel Optimal Transport (H. Mahler)
14:15 - 14:25		Break
		Chair: B. Wirth
14:25 - 14:50	P11	Optimization Problems in Banach Spaces with Non-Smooth Structure (C. Natemeyer)
14:50 - 15:15	P9	Constrained Mean Field Games: Analysis and Algorithms (S. Essadi, M. Theiß)
15:15 - 15:40	P18	Shape Optimization for Mitigating Coastal Erosion (L. Schlegel)
15:40 - 15:50		Break
15:50 - 16:20		*Equal opportunity/women's meeting*
16:30 - 17:30		Parallel sessions (`https://gather.town/app/4M82r9CkG6w6efPT/SPP%201962`): *PI meeting* *Young researchers' meeting*

Thursday, Mar 25

		Chair: C. Meyer
9:00 - 9:25	P15	Optimizing Fracture Propagation using a Phase-Field Approach (A. Hehl)
9:25 - 9:50	P17	Nonsmooth and Nonconvex Optimal Transport Problems (J. Lohmann)
9:50 - 10:15	P19	Semi-Smooth Newton Methods on Shape Spaces (K. Welker)
10:15 - 10:25		Break
		Chair: I. Yousept
10:25 - 10:50	P21	Theory and Solution Methods for Generalized Nash Equilibrium Problems Governed by Networks of Nonlinear Hyperbolic Conservation Laws (M. Steinhardt, J. Wachter)
10:50 - 11:15	P10	A Unified Approach to Optimal Uncertainty Quantification and Risk-Averse Optimization with Quasi-Variational Inequality Constraints (A. Alphonse)
11:15 - 11:40	P2	Multiobjective Optimization of Non-Smooth PDE-Constrained Problems — Switches, State Constraints and Model Order Reduction (B. Gebken, M. Bernreuther)
11:40 - 11:50		Break
11:50 - 12:10		*Presentation of activities concerning equal opportunity*
		Chair: W. Wollner
12:10 - 12:35	P3	Bilevel Optimal Control: Theory, Algorithms, and Applications (F. Harder)
12:35 - 13:00	P8	A Non-Smooth Phase-Field Approach to Shape Optimization with Instationary Fluid Flow (P. Herbert)
13:00 - 13:25	P1	Approximation of Non-Smooth Optimal Convex Shapes with Applications in Optimal Insulation and Minimal Resistance (H. Keller)
13:25 - 13:45		Closing remarks

List of Participants

1	Amal Alphonse	WIAS Berlin
2	Nikolaos Baloumis	U Helmut-Schmidt
3	Soeren Bartels	U Freiburg
4	Felix Baumann	Zuse Institute Berlin
5	Lukas Baumgärtner	HU Berlin
6	Marco Bernreuther	U Konstanz
7	Martin Brokate	TU München, WIAS Berlin
8	Stephan Dempe	TU Bergakademie Freiberg
9	Sarah Essadi	WIAS Berlin
10	Markus Friedemann	TU Bergakademie Freiberg
11	Bennet Gebken	U Paderborn
12	Nico Goldammer	U Helmut-Schmidt
13	Simone Göttlich	U Mannheim
14	Felix Harder	BTU Cottbus-Senftenberg
15	Keller Hedwig	U Freiburg
16	Andreas Hehl	U Bonn
17	Philip Herbert	U Koblenz-Landau
18	Roland Herzog	TU Chemnitz
19	Sebastian Hillbrecht	TU Dortmund
20	Michael Hintermüller	WIAS Berlin, HU Berlin
21	Michael Hinze	U Koblenz-Landau
22	Patrick Jaap	TU Dresden
23	Xiaoxi Jia	U Würzburg
24	Christian Kanzow	U Würzburg
25	Liudmila Karagyaur	Università della Svizzera italiana
26	Denis Khimin	U Hannover
27	Christian Kirches	TU Braunschweig
28	Dorothee Knees	U Kassel
29	Rolf Krause	Università della Svizzera italiana
30	Axel Kroener	WIAS Berlin
31	Julius Lohmann	U Münster
32	Dirk Lorenz	TU Braunschweig
33	Daniel Luft	U Trier
34	Hinrich Mahler	TU Braunschweig
35	Patrick Mehlitz	BTU Cottbus-Senftenberg

36	Christian Meyer	TU Dortmund
37	Georg Müller	U Konstanz
38	Carolin Natemeyer	U Würzburg
39	Ira Neitzel	U Bonn
40	Mame gor Ngom	U Bambey
41	Hong Quan Ba Nguyen	WIAS Berlin
42	Kostas Papafitsoros	WIAS Berlin
43	Sebastian Peitz	U Paderborn
44	Bastian Pötzl	U Bayreuth
45	Gabriele Rovi	Università della Svizzera italiana
46	Sebastian Sager	U Magdeburg
47	Oliver Sander	TU Dresden
48	Anton Schiela	U Bayreuth
49	Luka Schlegel	U Trier
50	Stephan Schmidt	HU Berlin
51	Bernhard Schmitzer	U Göttingen
52	Volker Schulz	U Trier
53	Diaraf Seck	U Cheikh Anta Diop, Dakar
54	Michael Sievers	TU Dortmund
55	Nicolai Simon	TU Darmstadt
56	Gerhard Starke	U Duisburg-Essen
57	Sonja Steffensen	RWTH Aachen
58	Marcel Steinhardt	TU Darmstadt
59	Thomas Surowiec	Philipps-Universität Marburg
60	Mike Theiß	Philipps-Universität Marburg
61	Stephanie Thomas	U Kassel
62	Anna Thünen	U RWTH Aachen
63	Michael Ulbrich	TU München
64	Stefan Ulbrich	TU Darmstadt
65	Stefan Volkwein	U Konstanz
66	Daniel Wachsmuth	U Würzburg
67	Gerd Wachsmuth	BTU Cottbus-Senftenberg

68	Julia Wachter	TU München
69	Martin Weiser	Zuse Institute Berlin
70	Manuel Weiß	TU Chemnitz
71	Kathrin Welker	U Helmut-Schmidt
72	Thomas Wick	U Hannover
73	Malte Winckler	U Duisburg-Essen
74	Benedikt Wirth	U Münster
75	Winnifried Wollner	TU Darmstadt
76	Irwin Yousept	U Duisburg-Essen
77	Patrick Zulian	Università della Svizzera italiana