



ANTONIN CHAMBOLLE

Monday, 19-03-25, 13:15-13:55

Title: Minimizers of the Griffith energy

FRANCESCA CRISPO

Monday, 19-03-25, 16:20-17:00

Title: Some remarks on the partial regularity of a suitable weak solution to the Navier-Stokes Cauchy problem

ANNA DALL'ACQUA

Wednesday, 19-03-27, 10:50-11:30

Title: On the elastic flow

FRANCESCO DELLA PORTA

Monday, 19-03-25, 14:35-15:00

Title: A moving mask hypothesis to select physically relevant microstructures

Martensitic transformations are often characterised by complex microstructures. This physical phenomenon has been widely studied from a mathematical perspective by introducing an energy functional and by studying its minimisers. However, it may occur that infinitely many minimisers exist, and it is an open problem to select the physically relevant ones. In this talk I present a moving mask hypotheses that can be used as a selection mechanism for physically relevant microstructures in thermally induced martensitic phase transitions. The moving mask hypotheses allows also to prove a rigidity result for the two-well problem, and to better understand the importance of the cofactor conditions, particular conditions of supercompatibility between phases, which are believed to influence reversibility.

LARS DIENING

Thursday, 19-03-28, 08:30-09:10

Title: Boundary Values of Functions with Bounded Deviatoric Variation

We study the boundary values of Sobolev functions and functions of bounded variations that are defined only by the deviatoric part of the gradient. We show that such function have traces in L^1 if the space dimension is three or higher. We also provide counterexamples for the two dimensional case. We also present the general case, where other parts of the gradients are examined.

JOACHIM ESCHER

Monday, 19-03-25, 15:40-16:20

Title: The Rayleigh-Taylor condition for the Muskat Problem

ILARIA FRAGALA

Wednesday, 19-03-27, 14:00-14:40

Title: Optimal partition problems and the honeycomb conjecture

ADRIANA GARRONI

Monday, 19-03-25, 13:55-14:35

Title: Variational models for material defects in solids

LORENZO GIACOMELLI

Wednesday, 19-03-27, 09:10-09:50

Title: A nonlinear fourth-order approximation of forward-backward parabolic equations

ARIANNA GIUNTI

Wednesday, 19-03-27, 15:20-15:45

Title: Homogenization in randomly perforated domains

We consider the homogenization of Poisson and Stokes equations in a bounded domain of \mathbb{R}^d , $d > 2$, perforated by many small holes. We assume that the holes are generated by a union of properly rescaled balls having random radii and centers. We show that for a large class of stationary probability measures, the homogenized, effective, equations are analogous to the case of periodic spherical holes. More precisely, for the Poisson equation [3], we recover in the homogenization limit an averaged version of the "strange term" established by Cioranescu and Murat [2]; in the case of Stokes equations [4], we show that the homogenized solution solves a Brinkmann-type system as in Allaire [1]. We stress that the main assumption of our setting is that the random radii of the balls generating the holes have finite $(d-2)$ -moment: This condition is minimal in order to ensure that the average of the capacity of the holes is finite, and still allows for the onset of clustering balls with overwhelming probability. These are joint works with R. Höfer and J.J.L. Velázquez (University of Bonn).

OLIVIER GLASS

Tuesday, 19-03-26, 14:00-14:40

Title: One-side boundary controllability of the p -system

ANTOINE GLORIA

Thursday, 19-03-28, 11:30-12:10

Title: Effective equations for the Schrödinger flow in quasiperiodic scenery

MAURIZIO GRASELLI

Tuesday, 19-03-26, 11:30-12:10

Title: Diffuse interface models for incompressible binary fluids with moving contact lines

ANNA KH. BALCI

Thursday, 19-03-28, 09:50-10:15

Title: Higher Regularity of the p-Poisson Equation in the Plane

ALEXANDER MIELKE

Thursday, 19-03-28, 12:10-12:50

Title: Effective kinetic relations and EDP convergence

ALAIN MIRANVILLE

Thursday, 19-03-28, 09:10-09:50

Title: The Cahn-Hilliard equation in image inpainting

STEFAN NEUKAMM

Thursday, 19-03-28, 10:50-11:30

Title: Quantitative homogenization in nonlinear elasticity

JEHAN OH

Monday, 19-03-25, 17:00-17:25

Title: Regularity for multi-phase variational problems

In this talk we consider a multi-phase energy functional whose ellipticity rate and growth change according to modulating coefficients. We show the Hölder regularity for the gradients of local minimizers of the multi-phase energy functional under sharp assumptions relating the growth couples to the Hölder exponents of the modulating coefficients. The talk is based on the joint work with Cristiana De Filippis.

ALDO PRATELLI

Wednesday, 19-03-27, 14:40-15:20

Title: Some existence and regularity results for an isoperimetric-type problem

ANTONELLA RITORTO

Wednesday, 19-03-27, 12:10-12:35

Title: Shape optimization problems involving the fractional Laplacian

Shape optimization problems arise in many fields, ranging from the classical isoperimetric problems to recent applications including elasticity and spectral optimization. In this talk, we prove existence of optimal shapes, where the cost function F is decreasing, and lower semicontinuous for a suitable notion of convergence in the class of s -quasiopen sets. Examples are related to fractional eigenvalues. The proof relies on a compactness result in the class of admissible domains, that uses Gamma-convergence theory. As a transition from the nonlocal to the local setting, we determine the asymptotic behavior of the s -optimal shapes when s tends to 1. We obtain a type of convergence of the s -minimizers to the 1-minimizer, studied by Buttazzo-Dal Maso'93, and Bucur-Buttazzo-Henrot'98. A key ingredient is the limit of the constant in the fractional Laplacian definition. The outcomes exposed in this talk are collaborations with Julián Fernández Bonder, and Ariel Martín Salort, from the Mathematics Department, University of Buenos Aires, Argentina.

RICCARDA ROSSI

Wednesday, 19-03-27, 08:30-09:10

Title: Visco-Energetic solutions to rate-independent systems, with applications to brittle fracture**MATTHIAS RUF**

Tuesday, 19-03-26, 15:20-15:45

Title: From the N-clock model to the XY-model: emergence of concentration effects in the variational analysis

In this talk we analyze to which extent the classical XY -model for S^1 -valued spin systems is approximated by the N-clock model, which allows for N different unit vector states of the spin variable. To this end, we perform a Γ -convergence analysis when both the lattice spacing and the minimal angle between different states vanish. Depending on the precise scaling, several concentration effects emerge, captured by the Jacobian, the BV -limit of the spin variable or the limit of its graph in the sense of Cartesian currents. This is joint work with Marco Cicalese and Gianluca Orlando (both TU Munich).

ANGKANA RÜLAND

Wednesday, 19-03-27, 16:55-17:35

Title: On the magnetic fractional Calderon problem

In this talk I discuss recent results on the magnetic fractional Calderon problem. In contrast to its local analogue this problem does not have a gauge and both the potential and the drift term can (generically) be determined uniquely and constructively from finitely many measurements. I also discuss the uniqueness and stability of the infinite measurement problem. This is based on joint work with M. Cekic (MPIM Bonn) and Y.-H.Lin (U. Jyväskylä).

FILIPPO SANTAMBROGIO

Tuesday, 19-03-26, 10:50-11:30

Title: New estimates for the JKO scheme

GIORGIO SARACCO

Wednesday, 19-03-27, 09:50-10:15

Title: The Cheeger problem of a Jordan domain without "necks"

The Cheeger problem consists in computing the infimum of the ratio perimeter over volume $(P(E)/|E|)$ among all subsets E of a given box Ω and finding, if they exist, the minimizers. The problem is far from being trivial: an explicit formula to compute the infimum and a complete characterization of minimizers is known only for convex sets and strips in the planar case. In this talk I will present a (sharp) extension of these results to a larger class of planar domains. As an application, we approximate the Cheeger constant of the Koch snowflake. Some open questions and future research directions will be addressed. Based on a joint work with Leonardi (Trento - IT), Neumayer (IAS, Princeton - US)

DIEDIER SMETS

Wednesday, 19-03-27, 16:15-16:55

Title: Stability of vortex columns**ARTUR STEPHAN**

Tuesday, 19-03-26, 12:10-12:35

Title: Evolutionary Gamma-convergence for a linear reaction-diffusion system with different time scales

We study a linear reaction-diffusion system involving slow and fast reactions and investigate its behavior if some reaction rates tend to infinity. Assuming detailed balance for the reactions, the reaction-diffusion system can be understood as a gradient flow in Wasserstein space. We show how an effective limiting system can be derived rigorously in the sense that the underlying gradient structure is preserved. The limiting process is a reaction-diffusion system with mixed diffusion coefficients, has only slow reactions and is coarse-grained with respect to the local equilibria of the fast reactions.

STEPHANIE THOMAS

Tuesday, 19-03-26, 09:50-10:15

Title: Optimal control of a rate-independent system constrained to balanced viscosity solutions

We analyze an optimal control problem which is constrained to *balanced viscosity (BV) solutions* of a *rate-independent system*. This system is given in terms of a *state variable* z , a time-dependent *external load* l , a *stored energy functional* E depending on l and z , and a *dissipation potential* R , which captures the dissipation due to internal friction. The evolution of z can now be described by a doubly nonlinear differential inclusion involving the Gâteaux derivative of E with respect to z , and the convex subdifferential of R . In rate-independent applications (e.g., dry friction, plasticity, fracture), the dissipative force does not depend on the velocity of the process, giving rise to a *positively 1-homogeneous* dissipation potential. We are further dealing with a *semi-linear*, but *non-convex* stored energy functional. In this case, we cannot expect continuous global energetic solutions, even if the external load is smooth. Therefore, we instead consider so-called BV solutions, which can be obtained via an approximation with viscously regularized systems. We then show existence of solutions of an optimal control problem which is governed by the rate-independent system, where the external load serves as control variable. Since we constrain the problem to BV solutions, the focus is on the proof of compactness of the corresponding solution sets. In order to obtain the necessary a priori estimates, we introduce a reparametrization in such a way that the transformed solutions satisfy an autonomous rate-independent system on the non-negative real half line. We then obtain the essential estimates for solutions of this autonomous system by ODE-arguments and transfer them back to BV solutions.

OLIVER TSE

Monday, 19-03-25, 17:25-17:50

Title: Dynamical-variational transport costs: Towards a framework for "generalised" gradient flows

In this talk, dynamical-variational transport costs (DVTs) will be introduced and motivated. The role in which these objects play in the theory of (generalised) gradient flows will be illustrated with an example on Markov jump processes. Finally, open questions and challenges will be mentioned.

MARIUS TUCSNAK

Tuesday, 19-03-26, 14:40-15:20

Title: The piston problem: well-posedness, stability and controllability

We consider the coupled PDEs/ODEs system modelling the motion of a solid in a viscous heat conducting gas. We first develop a systematic approach to obtain local well-posedness and asymptotic stability results. We next show that in the one dimensional case (the piston problem) some of our results are global. We also discuss the so called "adiabatic piston" problem, which is still of big interest in statistical physics. Finally, we show that for a simplified problem we obtain finite time controllability.

STEFAN ULBRICH

Tuesday, 19-03-26, 09:10-09:50

Title: Optimal boundary control of hyperbolic conservation laws with state constraints**EMIL WIEDEMANN**

Wednesday, 19-03-27, 11:30-12:10

Title: Measure-Valued Solutions for Fluids and Biology**BENEDIKT WIRTH**

Tuesday, 19-03-26, 16:30-17:10

Title: Variational models for transportation networks: weak-* relaxation and flat chains**ENRIQUE ZUAZUA**

Tuesday, 19-03-26, 08:30-09:10

Title: Dynamics and control for multi-agent networked systems