

MARS – Models, Algorithms, Computers and Systems

Modern high tech research in science and technology requires an interdisciplinary approach. This applies particularly to wide areas of the methodological sciences mathematics and computer science, where typically several aspects of closely related fields of research are considered. These start with a mathematical model, continue with algorithmic problems, and finally cover aspects of the implementation on computers or high performance computing environments and therefore also issues related to the efficiency of computer systems.

MARS is a doctoral programme at the Doctorate School PLUS (DSP Programme), which is organized by the departments of mathematics and computer science of the University of Salzburg. Its objective is to educate doctoral students in the research fields models, algorithms, computers, and systems and also to achieve new insights and research findings especially with regard to the inter-dependency of these fields of research. The focus will be on important topics relevant for the Salzburg research site. MARS fields of research form a cohesive and closely linked line of research and cover a wide spectrum of scientific interests.

Joint activities constitute the structured doctoral program in MARS. These include seminars with external guest speakers, one-day workshops with external guests and multi-day retreats away from the university, as well as summer schools on the topics of MARS.



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MARS

Models, Algorithms, Computers and Systems

MARS Workshop Analysis and Geometry

Department of Mathematics
Department of Computer Sciences
University of Salzburg

Programme and Abstracts

Monday, September 23rd 2019

Seminarraum 2, Naturwissenschaftliche Fakultät

10:30–11:30

Mathematics of Gas Networks Some aspects from the analytical point of view

Jens Habermann – University of Erlangen Nürnberg

The aim of the talk is to introduce the CRC Transregio 154 as an example of interdisciplinary mathematical research, involving mathematical modeling, analysis, simulation, optimization and numerics. In particular we will discuss some of the challenges and questions related to the CRC in the theory of Partial Differential Equations.

11:30–12:15

Partial regularity for degenerate parabolic systems of p -Laplacian type (disposition talk)

Leon Mons – University of Salzburg

In this talk I will present an overview about some topics that I am going to work on for my dissertation. The main focus will be on systems of parabolic PDE that satisfy some p -Laplacian type structure conditions. Since everywhere continuity of weak solutions (or of their gradient) cannot be expected when dealing with systems of equations, the aim will be to prove results about partial regularity instead, i.e. regularity outside of a singular set that has zero Lebesgue measure.

12:15–14:00

Lunch break

14:00–14:30

The one-sided bounded slope condition in evolution problems

Thomas Stanin – University of Salzburg

The bounded slope condition plays an important role in Hilbert-Haar theory, a branch of Calculus of Variations. In this talk, we introduce a one-sided version of this condition in the context of an evolutionary setting and present some recent regularity results based on this generalized constraint.

14:30–15:00

Stability for systems of the porous medium type

Rudolf Rainer – University of Salzburg

Stability properties of weak solutions for systems of the porous medium type are established. Considered are local stability as well as stability for an initial and boundary value problem, regarding to the exponent m . Both the degenerate as well as the singular case are covered.

15:00–16:00

Coffee break

16:00–16:30

Analyticity of critical points of knot energies

Nicole Vorderobermeier – University of Salzburg

In this talk, we give a short introduction to geometric knot energies and present techniques to show the analyticity of smooth critical points of the Möbius energy.

16:30–17:30

Energy of knots in the 3-sphere

Jun O'Hara – University of Chiba, Japan

The notion of energy of knots was introduced to produce “optimal shapes” of knots as energy minimizers. In recent years, a family of knot energies which measure the difference of intrinsic and extrinsic distances between pairs of points on knots has been studied intensively. In this talk I will introduce an energy for knots in the 3-sphere, using the spherical metric instead of Euclidean metric, and explain its advantage.

18:30

Dinner – Gasthof Goldgasse Goldgasse 10, Salzburg