NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 9 (2024)

Paper with Junming

... *dimensional case"*) has been submitted.

It introduces limiting at shocks for the 2-dim. 3rd order semi-discrete Active Flux method.

A shock wave impinging from the left onto a forward facing step. The 2-d compressible Euler equations are solved. Notice the nice roll-up of the vortex train.

Paper with Farah Kanbar and Min Tang submitted

The paper *Farah Kanbar, Christian Klingenberg, Min Tang: "Asymptotic and Stationary Preserving Schemes for the Isentropic Euler Equations with Gravitational Source Term"* has been submitted.

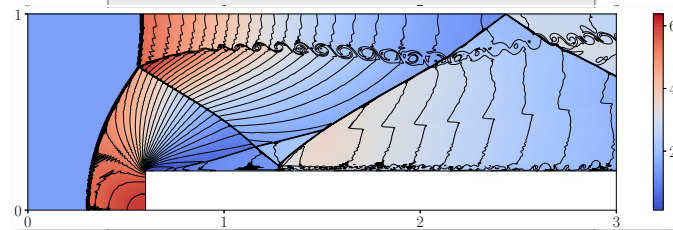A numerical scheme that is both ... making, Farah finished her PhD two years ago.

Simon Markfelder is moving to Konstanz University

Simon Markfelder studied at Würzburg University. In 2020 he ...ained his PhD there under my supervision, being co-advised by ...ard Feireisl. For a two year postdoc he went to Cambridge ...ersity, with Edriss Titi his postdoc advisor. Afterwards he returned to ...zburg University, where he obtained a grant by the German Science ...oundation (DFG) as part of a priority program on conservation laws. Now he is moving to Konstanz University as a 'Junior-professor'.

Simon has contributed to the theory of convex integration applied to compressible flow, Onsager type theorems and more.

It has been wonderful having Simon with us in Würzburg. He continues to be an inspiration for the whole work group.

Good luck, Simon!

In Oct 2018 we held a Fall School on Hyperbolic Conservation Laws. The lecturers were, from left to right: Eduard Feireisl, Sara Daneri, Constantine Dafermos, I was the organizer, Simon Markfelder.

...n Giesselmann will visit us

... August 29 *Jan Giesselmann* (TU Darmstadt, ...ny) will visit us for the whole day. He works on ...cal analysis for conservation laws. *This* is the announcement of his lecture.

Marlies Pirner visits us

September 22 - 27 *Marlies Pirner* from the University of Münster (Germany) will visit us. Her visit is timed such that it will (most likely) coincide with the PhD defense of Jayesh Badwaik, scheduled for that week.

Hyunju Kwon will visit us

On Oct. 31 *Hyunju Kwon* from the ETH Zürich will visit us for the whole day. Her work is related to the Onsager theorem, for both incompressible and compressible flow, using convex integration.

On that day Simon Markfelder will also visit us in Würzburg, so he can participate in the discussions with Hyunju.

Armin Hofmann submitted his Master thesis

Armin Hofmann submitted his Master thesis "Identification of troubled cells in the Discontinuous Galerkin (DG) method using neural networks and then transferring this to the Active Flux (AF) method".

The thesis is based among others on *this work* by Maria Han Veiga. A neural network is trained on DG to identify cells that need limiting. The attempt is made to use this for AF.

Sophie Lauer begins her Master thesis with us

Sophia Lauer begins her Master thesis with us. She plans to study non-uniqueness of 2-d compressible flow via convex integration.

Thomas Schuster begins his Master thesis

Thomas Schuster begins his Master thesis with us. He plans to make numerical simulations of compressible flow more efficient by using neural networks.

Upcoming scientific conferences

Click on the links and check where you might want to participate.

- Sept. 9 - 13, **2024**: *Conference on high-order nonlinear numerical methods for evolutionary PDEs* (HONOM2024) on the Crete Island, Greece, organized by Elena Gaburro

- Sept. 25 - 27, 2024: *Annual Meeting of the German-Speaking Inverse Problems Society 2024*, in Siegen (Germany)

- Nov. 4 - 7, 2024: "Numerical Methods for the Kinetic Equations of Plasma Physics" in Garching, Germany, organized by Eric Sonnendrücker

- Dec. 16 - 20, 2024: *14th AIMS conference on differential equations*, in Abi Dhabi, UAE, organized by the *American Institute of Mathematical Sciences* (AIMS)

- March 3 - 7, **2025**: *SIAM Conference on Computational Science and Engineering (CSE25)*, in Fort Worth, Texas, USA

- June 9 - 13, 2025: *Numerical methods for hyperbolic problems 2025* (NumHyp25), in Darmstadt, organized by Jan Giesselmann and others

- July 13 - 18, 2025: *International Conference on Spectral and High-Order Methods* (ICOSAHOM), in Montreal, Canada

- Sept. 14 - 20, 2025: Hirschegg Workshop, in the Kleinwalsertal, Austria, organized by Ferdinand Thein and Gerald Warnecke

- fall of 2025: SIAM Conference on Analysis of Partial Differential Equations (PD25), somewhere in the USA

- sometime in **2026**: Finite Volume and Complex Applications 11, in Münster, Germany

- 2nd half of July, 2026: 20th International Conference on Hyperbolic Problems: Theory, Numerics and Applications, in Stuttgart, Germany

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ICOSAHOM 2025

The International Congress on Spectral and High-Order Methods (ICOSAHOM) takes place about every 2 years. It covers high-order methods for the numerical solutions of differential equations. On the scientific committee are among others Jan Hesthaven and Yvon Maday (Paris). The *15th ICOSAHOM congress* will take place July 13 - 18, 2025 in Montréal, Canada.

The 14th AIMS Conference in Abu Dhabi

The *American Institute of Mathematical Sciences* is a publisher of journals. We have papers for example in their journal "Kinetic and Related Models". They also run bi-yearly conferences. The next one is the *14th AIMS Conference*, Dec. 16 - 20, 2024 in Abu Dhabi, UAE. Its focus is on analysis, differential equations and its applications. I have been invited to lecture there as part of a special session.

THE 14TH AIMS CONFERENCE
DECEMBER 16-20, 2024
NYU ABU DHABI

Plenary Speakers	Conference Features	
Robert Calderbank	Plenary Lectures	(60 min)
Ingrid Daubechies	Thematic Sessions	(45 min)
Lisa Fauci	Special Sessions (Over 100)	(30 min)
Svetlana Jitomirskaya	Contributed Sessions	(20 min)
Nader Masmoudi	Poster Sessions	
Xavier Ros Oton	Best Student Paper Competition	
Corinna Ulcigrai	Banquet will be held in the desert!	
Jun-Cheng Wei		
Ping Zhang		
Pingwen Zhang		

Travel Support
AWM on board: The meeting is in cooperation with AWM, and US participants may be eligible for AWM travel grants.

Enjoy **FREE** online access to all journals from December 1 - 31 with code: AIMS2024