

NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 10 (2023)

HYP2024

The 19th International Conference on
"Hyperbolic Problems: Theory, Numerics and Applications"
Shanghai Jiao Tong University, PR China
July 1-5, 2024

The main bi-yearly conference on hyperbolic problems will be held next year in Shanghai (HYP2024). It has formally been announced now and there is a [webpage](#). Note that the list of invited speakers has changed since my *last newsletter*, because of scheduling conflicts by some of the invited speakers.

What is curious is that Shi Jin no longer seems to function as an organizer.

The deadline for submitting contributed talks is the end of February, 2024 (March 15 for PhD students).

Simon submitted paper

Simon Markfelder submitted the paper: [S. Markfelder: "A New Convex Integration Approach for the Compressible Euler Equations and Failure of the Local Maximal Dissipation Criterion"](#).

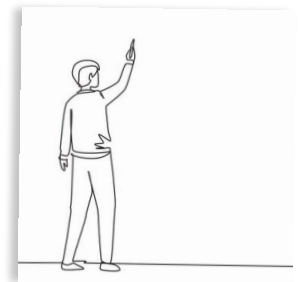
In this paper he constructs a new convex integration approach for the 2-dim. compressible Euler equations. With the help of this technique a new selection criterion is shown unfortunately not to choose the "physical" solution.

Because of its difficulty, Simon worked on this result (off and on) for 3 years.

Senior professor

For civil servants the date when the salary changes to a pension is fixed. For me this was 2 years ago. As a professor, if you wish to do so, you can continue to advise PhD students, apply for grants and teach. For this, the math department needs to provide office space and other support, and this is being generously provided to me.

Still, it is well considered if in this situation I am given the title 'senior professor'. For this, one needs to apply to the university, and it is given on grounds of scientific merit. It is typically given for 3 years. Currently I am a senior professor and I applied for an extension. This has now been granted to me for a second 3 year period.



Phil Roe Active Flux workshop

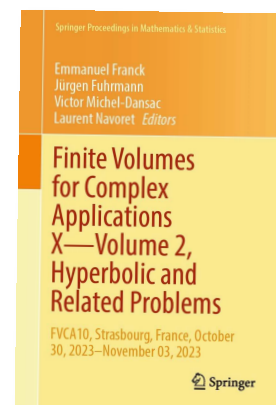
Phil Roe (85 years old) has made major contributions to computational compressible fluid mechanics. His thinking is highly original. About 10 years ago he devised the Active Flux finite volume method for the Euler equations. In March of 2024 he will be in Cambridge, UK. This is a good opportunity for some of those working on Active Flux, to meet up with Phil Roe for a small workshop organized by Wasilij Barsukow and Remi Abgrall. It will take place March 6 - 8 in Cambridge.



In 2026 "Finite Volume and Complex Applications 11" will be in Münster

The *Finite Volumes for Complex Applications 10* conference took place in early November of this year in Strasbourg. You can download the proceedings [here](#). Some members of our extended workgroup (like Wasilij Barsukow, Claudius Birke, myself) have contributed there.

The next conference of this series will take place in 3 years, 2026 in Münster, Germany.



Article with Claudius Birke accepted

The paper [Claudius Birke, Walter Boscheri, Christian Klingenberg: "A well-balanced semi-implicit IMEX finite volume scheme for ideal Magnetohydrodynamics at all Mach numbers"](#) has been accepted by Springer's [Journal of Scientific Computing](#), run by Chi-Wang Shu.

For ideal MHD with gravity a numerical scheme is proposed that is both well-balanced and has the low Mach property. An IMEX approach is used for the latter.

While we were working on this, we found out that another team was working on something quite related. We slightly modified the topic and won the race.

A paper with Rony Touma accepted

The paper [R. Touma, E. Malaeb, C. Klingenberg: "Unstaggered central schemes with the subtraction method for the shallow water equations"](#) has been accepted to the International Journal of Computational Methods.

In a paper with Praveen Chandrashekar and Jonas Berberich we had introduced a method to numerically exactly preserve a solution given a priori. It is very practical, and is applied here to shallow water.

Talks in my student seminar

In my student seminar, where I give topics to students to report on with a lecture, there will be 17 lectures in January, see [here](#).



Upcoming scientific conferences

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

- Dec. 18 - 19, 2023: [Fritz Röpke Workshop](#) in Heidelberg
- Jan. 16 - 19, **2024**: ["Kinetic and hydrodynamic PDEs \(Conference in honour of François Golse's 60th birthday\)"](#), at ETH Zürich, organized by Desvillettes and others
- Jan. 22 - 23: Kickoff workshop DFG priority program on hyperbolic problems, organized by Christian Rohde in Stuttgart, Germany
- Feb. 26 - March 1, 2024: [Oberwolfach workshop on Hyperbolic Balance Laws](#) will be organized by Remi Abgrall among others
- March 3 - May 31, 2024: [Numerical Methods for Nonlinear Hyperbolic PDEs](#), in Shenzhen, China, organized by Alex Kurganov, Chi-Wang Shu and Alina Chertok
- March 6 - 8, 2024: A Small Workshop on Active Flux, in Cambridge, UK, organized by Remi Abgrall and Wasilij Barsukow
- March 18 - 22, 2024: [Annual meeting of the GAMM](#) in Magdeburg, Germany, organized among many others by Peter Benner
- July 1 - 5, 2024: [XIX International Conference on Hyperbolic Problems: Theory, Numerics and Applications \(HYP 2024\)](#) in Shanghai, China, at Shanghai Jiao Tong University, organized by Yachun Li & Ya-Guang Wang
- Sept. 9 - 13, 2024: [Conference on high-order nonlinear numerical methods for evolutionary PDEs \(HONOM2024\)](#) on the Crete Island, Greece, organized by Elena Gaburro
- June 9 - 13, **2025**: NumHyp 2025, in Darmstadt
- summer of 2025: Sino-German workshop in Mainz, organized by Maria Lukacova
- Sept. 14 - 20, 2025: Hirschegg Workshop, in the Kleinwalsertal, Austria, organized by Gerald Warnecke and others
- sometime in **2026**: Finite Volume and Complex Applications 11, in Münster, Germany

Master thesis of Yu-Chen Cheng submitted

Yu-Chen Cheng has submitted her Master thesis "A Well-Balanced Method for an Unstaggered Central Scheme".

She applies an unstaggered version of a central scheme to the Euler equations with gravity. Some properties of the scheme are shown, and also numerical simulations are given.