

NEWSLETTER

Extra

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 12 (2024)

Junming Duan submits Active Flux limiting paper

Junming (jointly with Wasilij Barsukow and myself) had submitted two papers on limiting for the 3rd order Active Flux method: in May 2024 the one dimensional case ([see here](#)) and in July 2024 the two dimensional case ([see here](#)).

With the encouragement of the editor of the journal where both papers had been submitted to, these two articles were merged into a new paper [Junming Duan, Wasilij Barsukow, Christian Klingenberg: "Active flux methods for hyperbolic conservation laws - flux vector splitting and bound-preservation"](#) with supplementary material, [see here](#). This has now been submitted as a substitution for the original two papers. The simulations shown are from this paper and its supplement.

Wasilij Barsukow visits us this week

This week (Nov. 3 - 9, 2024) Wasilij Barsukow will visit our work group.

Wasilij obtained his PhD with us on a topic inspired both by Fritz Röpkes astrophysical simulations and Phil Roe's idea of a hybrid finite element/finite volume numerical method for multi-dimensional conservation laws (the Active Flux method). Wasilij spent time as a post-doc at Zürich University with Rémi Abgrall, and then was hired in France as a permanent researcher by the prestigious *Centre National de Recherche* (CNRS). With this position he now is at Bordeaux University, France.

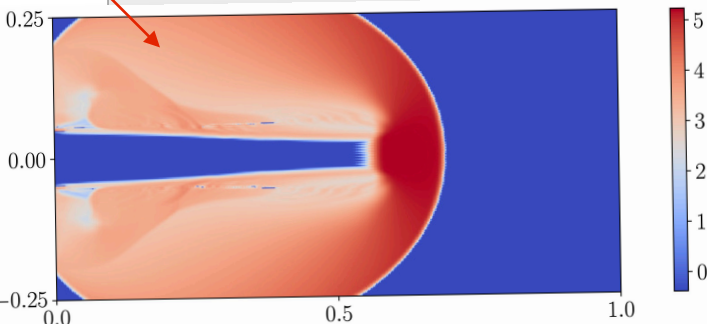
Wasilij and myself have a German Science Foundation research grant to pursue the Active Flux method. Both Lisa Lechner (a PhD student on this grant money) and Junming Duan (paid for by Humboldt as a post-doc) are working on this numerical method.

As part of our bi-yearly Bordeaux-Würzburg meetings, Wasilij is visiting us this week. We plan to finish up papers and work on new projects.

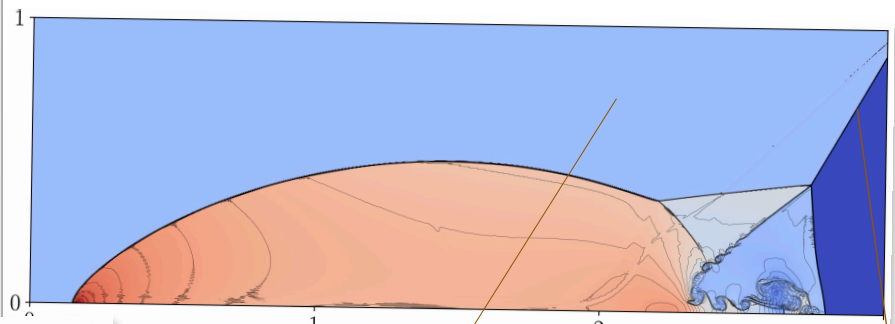


Wasilij

A high Mach number (Mach 2000) astrophysical jet simulated by a 3rd order Active Flux method that is limited, the pressure is shown. This is a uniform 400 x 200 mesh.



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A so called double Mach reflection simulated by a 3rd order Active Flux method which is limited. Density is shown on a 1440 x 480 mesh. Below an enlarged section of the right part of the solution above is shown.

