



Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

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A Finite Element view on arbitrarily high-order accurate Active Flux methods

Abstract:

The Active Flux method evolves averages/moments and, additionally, point values at cell interfaces, which is at once reminiscent of Discontinuous and Continuous Galerkin methods. This talk aims at positioning Active Flux amongst existing families of (stabilized) Finite Element methods. The point values can be updated either directly using so-called evolution operators, or by discretizing spatial derivatives first and using the method of lines to integrate in time. This latter, semi-discrete approach is the focus of this talk. The point values are shared among adjacent cells, giving rise to a continuous approximation of the solution. The key difference to classical continuous Galerkin methods is that there is no need to invert any global (or even local) mass matrix: Active Flux does not start out from a variational form and, instead, the update of the degrees of freedom is written down directly. At the same time Active Flux is conservative and can be seen as a high-order extension of Finite Volume, while keeping the stencil very compact, similar to Discontinuous Galerkin methods. This talk will present versions of Active Flux of arbitrary order of accuracy and show its relations to Continuous and Discontinuous Galerkin methods. In particular, it will be shown that Active Flux can be understood as a Petrov-Galerkin method with a biorthogonal family of continuous basis functions and discontinuous test functions.

room 40.03.003 (Emil Fischer Str. 40)

Thursday, March 19, 2026 at 12:30 pm,

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg