Oberseminar
Mathematische
Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Hyperbolic equations - structure preserving methods & other topics

David Ketcheson

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Carbuncles in the kitchen sink: approximate Riemann solvers and the shallow water circular hydraulic jump

Abstract:

When a jet of fluid hits a flat plate, the resulting flow consists of two regimes separated by a roughly-circular thin transition region known as a hydraulic jump. Depending on the fluid properties, the jump may be symmetric or chaotic, or may form other shapes. We investigate the behavior of the jump for an inviscid fluid modeled by the shallow water equations. This problem poses a challenge for numerical solvers, which tend to either exhibit artificial numerical instabilities (so-called carbuncles) or suppress the chaotic behavior that is expected in the high Froude number regime. We propose a new entropy-based Riemann solver that is capable of avoiding carbuncles while allowing the fluid instability to manifest itself.

This is joint work with Manuel Quezada de Luna.

via Zoom video conference (request the Zoom link from klingen@mathematik.uni-wuerzburg.de)

Friday, Nov. 12 at 3 pm CET

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg