Lothar Collatz Seminar
Summer 2022

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Dr. Claus Goetz (Universität Hamburg)

On inverse diffusion methods for numerical advection

Abstract:
The 1D linear advection equation,

$$\frac{\partial u(x,t)}{\partial t} + a\frac{\partial u(x,t)}{\partial x} = 0, \qquad (x,t) \in \mathbb{R} \times (0,\infty), \qquad a > 0,$$

arguably is the simplest PDE one could imagine. With modern computational tools at our disposal, solving it numerically should be a fairly simple task. However, it turns out that this innocent looking equation poses some serious challenges.

It is well-known that stable numerical advection methods need some amount of artificial diffusion. When dealing with discontinuous data this can lead to a very unpleasant smearing of the solution. In this talk we will explore ideas concerning the use of inverse diffusion techniques for the design of predictor-corrector type methods to cure this undesired smearing.

For further information please contact

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www.c3s.uni-hamburg.de/news-events/seminar-c3s.html