Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Structure preserving numerical methods for hyperbolic equations

Manuel Castro

Malaga, Spain

A general framework for the construction of high order well-balanced finite volume schemes for balance laws

Abstract:

In this talk we present the general framework presented in M. Castro, C. Pares, JSC 2020 to develop well-balanced high-order finite volume schemes for balance laws. The key ingredient of these methods is a well-balanced reconstruction operator, i.e. an operator that preserves the stationary solutions in some sense.

In this talk the specific case of 1 dimensional systems of balance laws is addressed and difficulties are gradually introduced: the methods are presented in the simpler case in which the source term does not involve Dirac masses. Next, systems whose source term involves the derivative of discontinuous functions are considered. In this case, the notion of weak solution is discussed and the Generalized Hydrostatic Reconstruction technique is used for the treatment of singular source terms. A technique to preserve the well-balancedness of the methods in the presence of numerical integration is introduced. Finally some numerical examples will be presented.

This is joint work with: M.J. Castro, C. Parés, I. Gómez.

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

Thursday, Oct. 1 at 9:30 am

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg