Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Hyperbolic equations - structure preserving methods & other topics

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Involutions of curl-type : from quantum mechanics to multiphase flows

Abstract:

One says that a stationary constraint (a combination of space derivatives of un- knowns which is equal to zero) is compatible with an evolutionary type PDE system, if it holds true for all times once it is initially satisfied. Sometimes such constraints are called involutions (C. Dafermos). The hyperelasticity and MHD are typical examples of PDEs with involutions.

I will give two new examples of such systems coming from the Hamilton principle of stationary action. The first one is the hyperbolic approximation of the Euler - van der Waals - Korteweg fluids (Dhaouadi, Favrie and SG 2019). It contains, as a particular case, the nonlinear Schr?odinger equation (via the Madelung transform). The second example is a multiphase system of compressible fluids with surface tension effects (Schmidmayer et al. 2017, S. Chiocchetti et al. 2020). In both cases the stationary constraint of curl - type appears. For the nonlinear Schr?odinger equation a *curl cleaning* method which is compatible with the energy conservation will be discussed (S. Busto et al. 2020).

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

Friday, Jan.. 22 at 3 pm GMT+1

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg