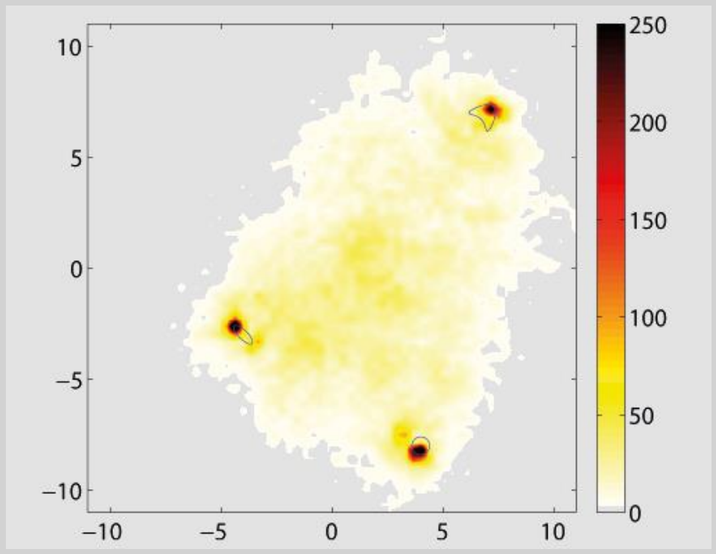

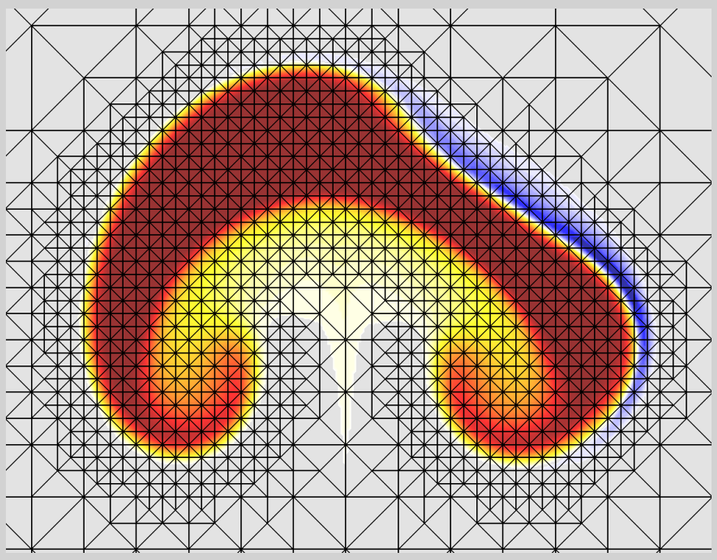

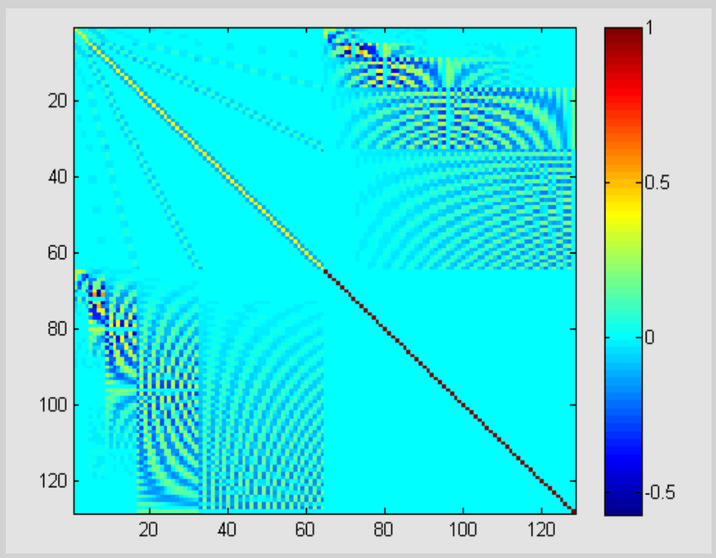

Oberseminar Numerik

Herr Prof. Phoolan Prasad
(Indian Institute of Science, Bangalore)

15.12.14
14:15 Uhr
05-426
Staudingerweg 9, 55128 Mainz

„KCL - A mathematical model to describe evolution of curves and surfaces”

Abstract:

In a large number of physical phenomena, we find propagating surfaces which need mathematical treatment. *d*-D kinematical conservation laws (KCL) are equations of evolution of a moving surface Ω_t in *d*-dimensional (x_1, x_2, …,x_d)-space IR^d. The KCL are derived in a specially dened ray coordinates (ξ_1, $\xi_{2,\ \ldots,}\xi_{d\text{-}1,}$ t), where ξ_1, $\xi_{2,\ \ldots,}\xi_{d\text{-}1}$ are surface coordinates on Ω_t and t is time.

KCL are the most general equations in conservation form, governing the evolution of Ω_t with physically realistic singularities. A very special type of singularity is a kink, which is a point on Ω_t when Ω_t is a curve in IR^2 and is a curve on Ω_t when it is a surface in IR^3. Across a kink the normal **n** to Ω_t and normal velocity m on Ω_t are discontinuous. Since the KCL system contains only kinematical relations, it is an underdetermined system of equations. In order to complete the system, we need to find additional equations representing the dynamics of Ω_t from the governing equations of the medium in which Ω_t propagates. The mathematical analysis of 3-D KCL system and computation with its help present a challenge since the eigenspace is not complete and there are geometric solenoidal constrains. We present a few examples of Ω_t and numerical results.

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You are cordially invited to attend.

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