

SEMINARIO MECÁNICA MATEMÁTICA

EXPOSITOR

Gino I. Montecinos
Centro de Modelamiento Matemático
Universidad de Chile

TITULO

The Generalized Riemann problem as a building block for high-order finite volume methods

Abstract

The Godunov theorem provides a limitation for finite volume schemes, linear and monotone; only first order of accuracy can be achieved. A family of non-linear schemes, called ADER (Arbitrary accuracy DERivative Riemann problems), attempting to circumvent Godunov's theorem, has been proposed. Building block for these schemes are: the polynomial reconstruction of cell averages and; the solution of special Cauchy problem, the so called generalized Riemann problems. The reconstruction and the solution of Generalized Riemann problems allow us to construct schemes of accuracy $p > 1$ such that spurious oscillations near high gradients are controlled. Advantages of these finite volume schemes are; efficiency, stability and accuracy.

In this seminar are presented: some notions on hyperbolic problems and elementary waves; classical Riemann problems and Godunov's type schemes; the Godunov theorem and the Harten theorem, which are the main results regarding the construction of numerical schemes; the generalized Riemann problems and the construction of high-order finite volume methods.

Jueves 03 de Julio del 2014, a las 16 : 30 hrs, Sala de Seminarios CMM, séptimo piso.