Seminario de Análisis Numérico y Modelación Matemática

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Título de la Charla:

High-Order Methods for Computational Astrophysics

Fecha y Hora:
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Lugar:

Auditorio Alamiro Robledo, FCFM

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Resumen

In computational fluid dynamics, high-order numerical methods have gained quite popularity in the last years due to the need of high fidelity predictions in the simulations. In astrophysical fluid dynamics, the finite volume methods have dominated the scene the last 20 years, being the standard second or third order accurate schemes. New algorithms have been developed to increase the spatial accuracy through very high-order reconstructions, but maintaining the scheme essentially non-oscillatory. In this talk we discuss the implementation of the very high-order accurate conservative finite difference, finite volume and the discontinuous Galerkin spectral element methods for the numerical solution of the Magnetohydrodynamics, Relativistic Hydrodynamics and Relativistic Magnetohydrodynamics equations in multiple space dimensions. The numerical schemes are implemented in the author's framework for solving conservation laws, XTROEM. Different flow configurations are considered, paying special attention to flows containing shocks. A very simple and efficient strategy for shock capturing for the three high-order methods presented in this talk is also discussed.