SORS: "High-Order Mimetic Differences and Applications"

Objectives

Abstract:

Mimetic methods construct discrete numerical schemes based on discrete analogs of spatial differential vector calculus operators like divergence, gradient, curl, Laplacian, etc. They mimic solution symmetries, conservation laws, vector calculus identities, and other important properties of continuum partial differential equations models. The original versions of these methods were restricted to be of low-order accuracy. High-order mimetic operators were later introduced, first by Castillo and Grone at San Diego State University, via the introduction of convenient inner product weights to enforce a discrete high-order extended Gauss divergence theorem, and later by a collaboration of Los Alamos National Laboratory and a group of researchers at Milano-Pavia. This review focuses on the developments of high-order mimetic differences by Castillo and his group at San Diego and the utilization of these techniques in different applications. In addition, when appropriate, it exhibits similarities and differences between the two methodologies.

Short Bio:

Dr. Castillo is the Founder and Director of the Computational Science Research Center and the Computational Science Program at SDSU. The Center facilitates cooperation between the university and industry as well as national laboratories. The center involves the participation of researchers from applied mathematics, astronomy, biology, chemistry/biochemistry, computer science, geology, mathematics and statistics, physics, geophysics, and engineering. Dr. Castillo has a wide range of interests in applied mathematics with emphasis on the numerical solution of partial differential equations, scientific computing, and modeling.

Speakers

Speaker: Prof. Jose E. Castillo. Founder and Director of the Computational Science Research Center at San Diego State University.
Host: WAVE Phenomena Group, CASE Department, BSC
Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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