Thursday, Dec. 3. at 9:30 am

Carlos Pares (Malaga, Spain

Title:
Well-balanced high-order finite difference methods for systems of balance laws

Abstract:

In this talk, a general methodology to design well-balanced high-order finite difference methods for systems of balance laws will be presented. The methods are based in the use of high-order reconstructions of the fluxes for the space discretization (like WENO) and TVD-RK methods for the temporal one. They are well-balanced in the sense that they preserve every smooth stationary solution or a prescribed set of them.

This methodology is inspired by the one followed in [1] for finite-volume methods: the similarities and differences between them will be discussed. Applications to different systems including the shallow-water model will be presented.

[1] M.J. Castro, C. Parés. Well-balanced high-order finite volume methods for systems of balance laws. Journal of Scientific Computing 82 (2), 48, 2020.
[2] C. Parés, C. Parés-Pulido. Well-balanced high-order finite difference methods for systems of balance laws. arXiv preprint arXiv:2001.10074, 2020.