

Entropy stable schemes for degenerate convection-diffusion equations: Convergence and high order approximations

Silvia Jerez

Centro de Investigación en Matemáticas (Mexico)

In the last decade, numerical formulations have been adapted for solving degenerate convection-diffusion equations by their importance for applications. Based on Tadmor's work [1], three-point entropy stable finite-difference schemes were extended for degenerate convection-diffusion equations in [2] considering an entropy-preserving convective flux along with extra numerical viscosity. In subsequent works, the convergence to entropy weak solutions for parabolic conservation laws as well as other qualitative properties of the entropy stable schemes were studied in [3]. Also, high-order entropy stable schemes using WENO interpolations for the local artificial viscosity were developed in [4]. In this talk, we will discuss the results obtained in the last two mentioned works. References 1. Tadmor E., The numerical viscosity of entropy stable schemes for systems of conservation laws. I. Math. Comp. 103 (1987), 49-91. 2. Jerez S. and Pares C., Entropy stable schemes for degenerate convection-diffusion equations. SIAM J. on Num. Anal 55.1 (2017), 240-264. 3. Acosta C. and Jerez S., Convergence of entropy stable schemes for degenerate parabolic equations with a discontinuous convection term, ESAIM: Math. Model. Numer. Anal. 57.3 (2023), 1445-1472. 4. Acosta C. and Jerez S., High-order entropy stable schemes based on a local adaptive WENO viscosity for degenerate convection-diffusion equations. Appl. Numer. Math. 197 (2024): 322-343.

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