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FOWENO schemes for degenerate parabolic conservation laws

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We extend the Fast and Optimized Weighted Essentially Non-Oscillatory FOWENO schemes [3] for nonlinear degenerate parabolic equations [5]. Fast WENO methods [1] were introduced with the goal of reducing computational costs for the smoothness indicators calculations. Whereas, Optimal WENO schemes [2] were developed to increase the accuracy of the approximation near critical points. Here, both techniques are adapted for degenerate parabolic conservative laws obtaining: FOWENO34 and FOWENO56 reconstructions, where the first and second digit represent the order of approximation for the convective and diffusive flux, respectively. By considering a SSP Runge-Kutta method [4] for the time discretization, an experimental analysis is carried out in order to show the efficiency and accuracy of FOWENO approximations for one and two-dimensional parabolic problems with degenerate diffusion.

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