

# A highly efficient low-dissipation hybrid weighted essentially non-oscillatory scheme

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## **Abstract**

In this paper, we propose a simple hybrid WENO scheme to increase computational efficiency and decrease numerical dissipation. Based on the characteristic-decomposition approach, the scheme switches between the numerical fluxes with characteristic-wise WENO reconstruction and with the component-wise corresponding optimal linear reconstruction according to a new discontinuity detector. This non-dimensional discontinuity detector measures the resolution limit of the linear scheme and does not degenerate at critical points. A number of numerical examples computed with 5th-order WENO scheme suggest that, while achieving very small numerical dissipation and good robustness, the computational effort for the WENO part in the hybrid scheme is insignificant.