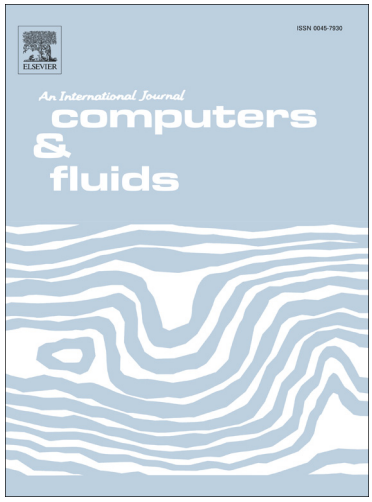

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A New Technique for Freestream Preservation of Finite-difference WENO on Curvilinear Grid

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Abstract

A new technique for a finite-difference weighted essentially nonoscillatory scheme (WENO) on curvilinear grids to preserve freestream is introduced. This technique first divides the standard finite-difference WENO into two parts: 1) a consistent central difference part and 2) a numerical dissipation part. For the consistent central difference part, the conservative metric technique is directly adopted. For the numerical dissipation part, it is proposed that the metric term should be frozen for constructing the upwinding flux. This treatment only affects the numerical dissipation part, and the order of accuracy is maintained. With this technique, the freestream is perfectly preserved, and the flow fields are better resolved on wavy and random grids.

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