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The effects of extended stencil sizes and mildly anisotropic grids on finite volume OLES SIGFRIED HAERING, NICHOLAS MALAYA, JEREMY HIRA, ROBERT MOSER, University of Texas at Austin — Optimal large eddy simulations (OLES) utilize stochastic estimation to approximate the convective terms and produce statistically accurate LES. This formulation requires multi-point velocity correlations as input for the sub-grid model. Rather than relying on DNS data, these correlations can be completely determined from Kolmogorov inertial-range theory, small-scale isotropy, and the quasi-normal approximation. Initially, these models were developed for a particular stencil ($4 \times 1 \times 1$) on an isotropic grid, and produced accurate LES results. However, for OLES to become generally useful, it must be developed for anisotropic and inhomogeneous grids. Additionally, the optimal extent of correlation information to include must be determined. Here, we examine the effects of extending stencil sizes and introducing mild anisotropy. We present results from simulations characterizing the dependence of the model operators on a wide range of stencils and grid sizes. Modestly sized stencils are found to produce results nearly identical to the larger sets. These results provide evidence of ideal OLES operators for generic grids.

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