Abstract Submitted
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Characterizing Finite Volume Operators for LES[1] JEREMY HIRA, NICHOLAS MALAYA, VENKAT RAMAN, ROBERT MOSER, University of Texas at Austin — Optimal large eddy simulation (OLES) is an approach to LES sub-grid modeling that requires multi-point correlation data as input. Until now, this has been obtained by analyzing DNS statistics. In the finite-volume OLES formulation studied here, under the assumption of small-scale homogeneity and isotropy, these correlations can be theoretically determined from Kolmogorov inertial-range theory and the quasi-normal approximation. Resulting models are expressed as generalized quadratic and linear finite volume operators that represent the convective momentum flux, and they have been found to produce accurate LES results. The operators have been analyzed to determine their characteristics as numerical approximation operators and as models of subgrid effects. In addition, the dependence of the model operators on the anisotropy of the grid and on the size of the stencils is analyzed to develop idealized general operators that can be used on general grids. These constitute finite volume turbulence operators applicable in a wide range of LES problems.

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