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**Modeling the Effect of Resolution Inhomogeneity in LES** GOPAL YALLA, ROBERT MOSER, TODD OLIVER, Oden Institute for Computational Engineering and Sciences, The University of Texas at Austin, SIGFRIED HAERING, Argonne National Laboratory, BJORN ENGQUIST, Oden Institute for Computational Engineering and Sciences, The University of Texas at Austin — Large eddy simulation (LES) of complex turbulent flows often requires discretizations with resolution that varies rapidly in space. The importance of resolution inhomogeneity in LES has been recognized for a long time, but its numerical impact is not well-understood. Consequently, resolution inhomogeneity effects are largely ignored in the formulation of standard subgrid stress models, which can lead to poor performance in practical applications on complex, highly inhomogeneous grids. In this talk, the effect of convection through inhomogeneous resolution on homogeneous, isotropic turbulence is examined and the development of a new formulation to correct for such inhomogeneity issues is presented. This model formulation is based on (1) updated analysis of the commutator between the filtering and differentiation operators, and (2) propagation properties of the underlying numerical methods. We will also discuss how to further exploit the structure of numerical operators for the correction of issues associated with resolution inhomogeneity.

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