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Adaptive mesh refinement for large-eddy simulation using the dynamic reconstruction model LAUREN GOODFRIEND, FOTINI CHOW, UC Berkeley, MARCOS VANELLA, ELIAS BALARAS, University of Maryland — Combining large-eddy simulation (LES) with adaptive mesh refinement (AMR) to reduce computation costs yields a powerful technique for modeling flows with complex geometries. Increased errors associated with the variable mesh sizes used in AMR have limited computations combining these methods. Using explicit filtering to separate turbulent stresses into resolvable sub-filter scale (RSFS) and sub-grid scale (SGS) terms may help control these errors. In this study, the dynamic reconstruction model (DRM) is used to approximate the RSFS stress using a series expansion to invert the explicit filter operation, with a dynamic eddy viscosity model for the SGS stress. DRM has previously been shown to reduce numerical truncation errors, leading to a more accurate turbulence closure. Here, the effect of using discontinuous versus continuously varying filter width across a grid refinement interface is investigated in the context of DRM. Decaying isotropic turbulence is advected past a refinement interface in which the grid is coarsened. Results are compared using explicit filtering with different levels of reconstruction and without using explicit filtering.

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