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Assessment of regularization models for LES of high-Re turbulent flows ABHILASH CHANDY, Department of Mechanical Engineering, University of Akron, Akron, OH, STEVEN FRANKEL, School of Mechanical Engineering, Purdue University, West Lafeyette, IN — Regularization-based SGS turbulence models for LES are quantitatively assessed for decaying homogeneous turbulence (DHT) and transition to turbulence for the Taylor-Green vortex (TGV) through comparisons to laboratory measurements and DNS respectively. LES predictions using the Leray-α, LANS-α, and Clark-α regularization-based SGS models are compared to the classic non-dynamic Smagorinsky model. Regarding the regularization models, this work represents their first application to relatively high Re decaying turbulence with comparison to the active-grid-generated decaying turbulence measurements of Kang *et al.* (JFM, 2003) at $Re_\lambda \approx 720$ and the $Re = 3000$ DNS of transition to turbulence in the TGV of Drikakis *et al.* (J. Turb., 2007). For DHT the non-dynamic Smagorinsky model is in excellent agreement with measurements for t.k.e., but higher-order moments show slight discrepancies and for TGV, the energy decay rates agree reasonably well with DNS. Regarding the regularization models stable results are not obtained as compared to Smagorinsky at the same grid resolution for various values of α, and at higher resolutions, they are in worse agreement. However, with additional dissipation such as in mixed α-Smagorinsky models, results are acceptable, but show slight deviations from Smagorinsky.

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