Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Recovery of subgrid-scale kinetic energy in large-eddy simulations of incompressible wall-bounded flows YIFENG TANG, RAYHANEH AKHAVAN, Dept. of Mechanical Engineering, University of Michigan, Ann Arbor, MI 48109-2125, USA — A method is presented for recovering the subgrid-scale kinetic energy in large-eddy simulations (LES) of wall-bounded flows. The formulation is based on extending the one-dimensional energy spectra obtained in LES using the filtered one-dimensional energy spectra derived from the theoretical formulations of Pao (1965) or Meyers and Meneveau (2008) for the three-dimensional energy spectrum in isotropic turbulence. To allow for application of these formulations to wall-bounded flows, the LES spectra are re-normalized into an isotropic space. Once the SGS kinetic energy is recovered, the individual components of turbulence intensities are computed using the formulation of Winckelmans *et al.* (2002). The entire procedure is applied as a post-processing step and can be combined with any SGS model. In tests performed using filtered DNS databases of turbulent channel flow at a $Re_\tau \approx 570$, the method recovered the SGS kinetic energy with errors of less than 10% and the total kinetic energy with errors of less than 1%. In application to LES data obtained using the Dynamic Smagorinsky Model, the individual components of turbulence intensities were recovered with an accuracy comparable to that with which the filtered statistics were predicted in LES.

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Date submitted: 03 Aug 2009 Electronic form version 1.4