

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Turbulence modeling for finite volume LES of channel flow with unresolved wall layers HENRY CHANG, ROBERT MOSER, University of Texas at Austin — An incompressible turbulent channel flow is simulated using a staggered grid finite volume LES. The grid is uniform with $\Delta y^+ = 50$ and is therefore unresolved near the wall. Optimal large eddy simulation models (OLES) are applied with results that are similar to many other LES models near the wall. For example, the rms streamwise velocity fluctuations are greatly over-predicted. To address this issue, the OLES model is reformulated based on a Reynolds decomposition of the velocity, with OLES models for the mean and fluctuating fluxes formulated according to their statistical structure. These models yield much better LES results, with only a slight over-prediction of streamwise velocity fluctuations. This talk will cover the details of the models, the LES results, and the implications for LES models of wall-bounded flows.

Henry Chang
University of Texas at Austin

Date submitted: 05 Aug 2011

Electronic form version 1.4