Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Wall-modeling for large-eddy simulation of high Reynolds number supersonic flows[1] SOSHI KAWAI, JOHAN LARSSON, SANJIVA LELE, Center for Turbulence Research, Stanford University — We present an idea of approximate wall-boundary-condition approach with dynamic procedure for large-eddy simulation of Mach 3 supersonic turbulent boundary layer at various Reynolds numbers ($Re_\delta = 2 \times 10^4$, 10^5 and 10^6) on a flat plate. This wall-model is the extension of previous work by Wang and Moin [Phys. Fluid, **14**, 2043 (2002)] for incompressible flows to compressible flows. We note that the present study is both the first extension of the dynamic concept to compressible flows and also the first test at high Reynolds number flows. The present study also revisits the issue of numerical errors near wall-region on outer-layer coarse LES mesh. The numerical results are compared with wall-resolved LES data (at low Reynolds number case) and available experimental data (at high Reynolds number case).

Soshi Kawai
Center for Turbulence Research, Stanford University

Date submitted: 10 Aug 2010   Electronic form version 1.4