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A Comparative Study of Subgrid Scale Models, for Prediction of Transition in Turbulent Boundary Layers[1] TARANEH SAYADI, PARVIZ MOIN, CTR at Stanford University — Large eddy simulation of subharmonic transition of a spatially developing zero pressure gradient boundary layer at $Ma = 0.2$ is investigated using three different subgrid scale (SGS) models: Dynamic Smagorinsky [1], dynamic model involving the SGS kinetic energy [2] and dynamic scale similarity model. The interest lies in assessing the capability of each model in predicting the location of transition and the overshoot in the skin friction coefficient which is specific to this transition scenario. In the case of dynamic Smagorinsky model results were obtained for four different grid resolutions and it is observed that the location of transition is largely unaffected, indicating robust performance of the dynamic model in this respect. However, after breakdown and in the turbulent region the simulations with coarsest grids produce insufficient eddy viscosity to sustain the correct value of skin friction along the plate. As a result the coarsest resolution is employed to compare the performance of these three models. The point of transition is estimated correctly in each case, but the value of the overshoot and the turbulent statistics are affected by the model. [1] Moin P. *et. al.* Phys Fluids A, **3**(11), 2746-2757, 1991. [2] Ghosal. S. *et. al.* JFM, **286**, 229- 255, 1995.

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