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Comparison two different LES closure models of the transitional boundary layer flow DIMITRY IVANOV, ANDREI CHORNY, A.V. Luikov Heat and Mass Transfer Institute, Minsk, Belarus — The goal of the present research is to measure the velocity profile in the thin boundary layer of a flat plate at zero angle of attack. We consider a flow over a flat plate with a uniform velocity profile. The uniform velocity fluid hits the leading edge of the flat plate, and a laminar boundary layer begins to develop. The near-wall, subgrid-scale (SGS) model is used to perform Large Eddy Simulation (LES) of the incompressible developing, smooth-wall, flat-plate turbulent boundary layer. In this model, the stretched-vortex, SGS closure is utilized in conjunction with a tailored, near-wall model designed to incorporate anisotropic vorticity scales in the presence of the wall. The composite SGS-wall model is presently incorporated into a computer code suitable for the LES of developing flat-plate boundary layers. Presently this model is extended to the LES of the zero-pressure gradient, flat-plate turbulent boundary layer. LES solver using Smagorinsky and the One-equation LES turbulence models. Results show that the normalized mean velocity profile is in good agreement with the universal law-of-the-wall and previous published data. In order to ensure the quality of the numerical results a convergence study was performed.

Dimitry Ivanov
A.V. Luikov Heat and Mass Transfer Institute, Minsk, Belarus

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