

Abstract Submitted
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Near-wall formulation for LES, Part 2: High Reynolds number flows GEORGI KALITZIN, JEREMY TEMPLETON, GORAZD MEDIC, Stanford University — The near-wall eddy-viscosity formulation described in Part 1 is applied to flows at high Reynolds numbers. For high Reynolds numbers, computational cost limits LES to coarse grids where the near-wall region is not resolved. In place of no-slip boundary conditions, wall stress boundary conditions are applied. Coarse LES of channel flow has been performed for flows with Reynolds numbers up to $Re_\tau = 1,000,000$. Several computational grids have been used to assess the grid dependency of the method. In contrast to simulations with only the wall stress boundary conditions, the proposed near-wall treatment predicts well the mean velocity profile over a range of Reynolds numbers. Unlike RANS simulations, this method retains velocity fluctuations and coherent structures. Stress balances show that resolved stress is significantly larger than the modeled stress.

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