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Towards wall filtering for LES of wall bounded flows MOHAMMAD SHOEYBI, Stanford University, JEREMY A. TEMPLETON[1], Sandia National Laboratories, PARVIZ MOIN, Stanford University — Large filter widths are necessary for LES to efficiently compute large scales of high Reynolds number flows. If large filter widths are used near wall, the no-slip boundary condition does not apply anymore. Vanishing filter width near the interface will introduce commutation error. Recently, Templeton & Shoeybi (*Multiscale Mod. Sim.*, 2006) proposed an approach based on filtering the solution over an infinite domain for one-dimensional problems. This allows the LES equations, including boundary conditions, to be precisely defined without any commutation error. In this work, the method is extended to higher dimensional spaces and is applied to incompressible Navier-Stokes equations. A particular challenge with these equations is the treatment of the pressure which plays the role of both an applied force and a Lagrange multiplier to enforce the divergence-free constraint. Results for several systems, including the heat equation, Burgers' equation, and higher dimensional Navier-Stokes equations will be presented.

[1]The work was done while studying at Stanford University

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