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Grid Independent Large-Eddy Simulation using Explicit Filtering[1] SANJEEB BOSE, PARVIZ MOIN, DONGHYUN YOU, Center for Turbulence Research, Stanford University — The governing equations for large-eddy simulation are derived from the application of a low-pass filter to the Navier-Stokes equations. It is often assumed that discrete operations performed on a particular grid act as an implicit filter causing results to be sensitive to the mesh resolution. Alternatively, explicit filtering separates the filtering operation from the underlying mesh distribution, thereby eliminating grid sensitivities. We investigate the use of explicit filtering in large-eddy simulation in order to obtain numerical solutions that are grid independent and are not influenced by numerical errors. The extension and implementation of high-order, commuting filters (Vasilyev *et. al*, *J. Comp. Phys.*, 1998) in the context of wall-bounded flows will be discussed. The convergence of simulations using a fixed filter width with varying mesh resolutions to a *true* LES solution will be analyzed, with particular attention to the performance of the chosen subgrid scale model. Results from planar channel flow simulations using LES with explicit filtering at $Re_\tau = 180$ and 395 will be presented.

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