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Isolating Numerical Error Effects in LES Using DNS-Derived Sub-Grid Closures[1] AYABOE EDOH, UCLA and AFRL, ANN KARAGOZIAN, UCLA — The prospect of employing an explicitly-defined filter in Large-Eddy Simulations (LES) provides the opportunity to reduce the interaction of numerical/modeling errors and offers the chance to carry out grid-converged assessments[2], important for model development. By utilizing a quasi *a priori* evaluation method – wherein the LES is assisted by closures derived from a fully-resolved computation[3] – it then becomes possible to understand the combined impacts of filter construction (e.g., filter width, spectral sharpness) and discretization choice on the solution accuracy. The present work looks at calculations of the compressible LES Navier-Stokes system and considers discrete filtering formulations in conjunction with high-order finite differencing schemes. Accuracy of the overall method construction is compared to a consistently-filtered exact solution, and lessons are extended to *a posteriori* (i.e., non-assisted) evaluations[4].

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[2]Radakrishnan and Bellan, **J. Fluid Mech.**, 697, 399-435 (2012)
[3]De Stefano and Vasilyev, **Theoret. Comput. Fluid Dyn.**, 18, 27-41 (2004)
[4]Edoh *et al.*, AIAA Paper 2017-3952 (2017)

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