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Estimating the Effective Reynolds Number in Implicit Large Eddy Simulation FERNANDO GRINSTEIN, LANL, YE ZHOU, LLNL, ADAM WACHTOR, BRIAN HAINES, LANL — In implicit large-eddy simulation (ILES) energy-containing large scales are resolved, and physics capturing numerics are used to spatially filter-out unresolved scales and implicitly model subgrid scale effects. From an applied perspective, it is highly desirable to estimate a characteristic Reynolds number (Re) – and therefore a relevant effective viscosity, so that the impact of resolution on predicted flow quantities and their macroscopic convergence can be usefully characterized. We argue in favor of obtaining robust Re estimates away from the smallest scales of the simulated flow – where numerically controlled dissipation takes place, and propose theoretical basis and framework to determine such measures. ILES examples include forced turbulence as a steady flow case, the Taylor-Green vortex to address transition and decaying turbulence, and simulations of a laser-driven reshock experiment illustrating a fairly complex turbulence problem of current practical interest.

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