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Filtered linear forcing: a technique for simulating high Reynolds number turbulence in physical space JOHN PALMORE, OLIVIER DESJARDINS, Cornell University — Low waveshell spectral forcing has been proven to be a simple and effective manner to generate isotropic turbulence in a periodic domain. This simplicity is lost for flow problems with complex boundary conditions such as resolved particle flows, fluid-fluid flows with interfaces, and wall-bounded flows. Lundgren's linear forcing in physical space is a straightforward and easy-to-implement method to tackle these problems; however, the use of this method results in a halving of the large turbulence length scale. The technique that will be presented in this talk applies a low-pass filter to the source term used in linear forcing. It is shown to recover the scale resolution of low waveshell spectral forcing which translates to an approximately 60 percent increase in the attainable Reynolds number for a given computation domain. The characteristics of homogeneous isotropic turbulence generated using filtered linear forcing will be discussed. Finally, extension of this idea to scalar forcing will be presented.

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