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Stochastic Coherent Adaptive Large Eddy Simulation of linearly forced homogeneous turbulence[1] GIULIANO DE STEFANO, Seconda Universitá Napoli, Italy, OLEG V. VASILYEV, University of Colorado at Boulder — In this talk we present the application of the Stochastic Coherent Adaptive Large Eddy Simulation (SCALES) method to the simulation of forced isotropic turbulence. In the SCALES approach, an explicit wavelet filtering procedure is applied in order to localize in space and follow in time the flow structures of significant energy. A suitable subgrid-scale (SGS) model is exploited to represent the effect un unresolved less energetic eddies upon the dynamics of resolved motions. Local dynamic SGS models based upon the kinetic energy content of the unresolved motions are employed in this work. An evolution model equation for the additional energy variable is solved along with the wavelet-filtered incompressible Navier-Stokes equations. The forcing scheme recently proposed by Lundgren, according to which the forcing term is proportional to the velocity field, is directly applied in physical space. Good results are obtained in terms of low order flow statistics, when compared to pseudo-spectral reference solution, as well as grid compression, which is a fundamental parameter for wavelet-based numerical simulation of turbulence. In particular, the grid compression converges to a (statistically) steady high value that allows to simulate moderately high Reynolds number flows with affordable computational cost.

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