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A Spectral Adaptive Mesh Refinement Method for Homogenous Isotropic Turbulence LEILA NASR AZADANI, ANNE STAPLES, Virginia Tech — We present an algorithm for accelerating simulations of homogenous isotropic turbulence. The method is akin to an adaptive mesh refinement (AMR) technique, applied in Fourier space. In direct numerical simulations of turbulence (DNS) the mesh size or the number of Fourier modes is defined based on the ratio of the sizes of the largest to smallest eddies that can be formed during the computation. The range of spatial scales in evolving turbulent flows changes with time. Early in a computation there may exists only large eddies and a coarse mesh will be enough to capture all the details of the flow, while at another time smaller eddies may form and a finer mesh will be required to resolve all scales. Therefore, instead of performing DNS with a constant fine mesh, AMR techniques can be applied and the mesh size can be varied during the computation in order to have optimum mesh sizes and save computational time. The spectral AMR method we present here is applied to 2D and 3D homogenous isotropic turbulence and results are compared with the DNS performed using a fine mesh.

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