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Subgrid scale models for AMR simulations of compressible turbulence

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I will report on a generalization of the eddy-viscosity closure for turbulence in the compressible regime, which was tested by filtering high-resolution data from forced turbulence simulations. This closure is used in an unresolved turbulence energy model with production, dissipation, and diffusion terms. The model fulfills basic requirements such as power-law scaling of the turbulence energy with the grid scale and constancy of the dissipation rate. The application of this subgrid scale model in AMR simulations poses new problems because the separation into resolved and unresolved energy fraction has to be adjusted when grids are refined or de-refined. I will outline algorithms to tackle these problems and show first applications. Finally, I will touch upon subgrid scale models for magnetohydrodynamic turbulence.