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Shear Improved Smagorinsky Model[1] FEDERICO TOSCHI[2], Center for Turbulence Research, Stanford, JEAN-PIERRE BERTOGLIO, Ecole Centrale, Lyon, France, GIANLUCA IACCARINO, HIROMICHI KOBAYASHI[3], Center for Turbulence Research, Stanford, EMMANUEL LEVEQUE, ENS-Lyon, France, UGO PIOMELLI[4], Center for Turbulence Research, Stanford, LIANG SHAO, Ecole Centrale, Lyon, France — Shear Improved Smagorinsky Model (SISM) - a new eddy viscosity model for Large Eddy Simulations (LES) - has recently been introduced and tested in channel flow geometries (E. Leveque et al. nlin.CD/0605053). The formulation of the model is based on the following definition for the eddy viscousity $\nu_T = (C_s\Delta)^2(|\overline{S}| - |\langle\overline{S}\rangle|)$, where $|\overline{S}|$ is the norm of the resolved strain tensor (as for the usual Smagorinsky model) and $|\langle\overline{S}\rangle|$ is the norm of the average shear. With respect to Smagorinsky model, the SISM has zero viscosity in laminar flow regions and a damped viscosity at approaching solid boundaries: these features allow to avoid the use of wall damping functions. Here we present tests benchmarking the model, in particular comparing it to the dynamical model, in channel flows and in a more complex flow geometry, namely the backward facing step.

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