Studies of the NS-alpha model using a lid-driven cavity flow[1] K.A.
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— The NS-alpha equations have a more compact energy spectrum than the Navier-
Stokes equations. Hence, it has been proposed in the literature to use them as a
turbulence model. Here we present results from our experience in applying the NS-
alpha model to an anisotropic and inhomogeneous flow, namely, a lid-driven cavity
flow. It was found that the isotropic NS-alpha model generated excessive backscatter
near the lid. Following an LES methodology, where the smoothed velocity is used as
the dependent variable, the anisotropic NS-alpha equations were then investigated
as a subgrid model. As compared to the isotropic model, the anisotropic model is
found to remove the excessive backscatter near the cavity lid, resulting in improved
velocity profiles. The ability of the model to correctly reflect the turbulent state of
the cavity, and to reproduce the anisotropy in the turbulent stresses near the cavity
bottom will be discussed.

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