

Çinlar Subgrid Scale Stress Model for Large Eddy Simulation

Rukiye Kara

Abstract

We construct a new subgrid scale (SGS) stress model for representing the small scale effects in large eddy simulation (LES) of incompressible flows. We use the covariance tensor for representing the Reynolds stress and include Clark's model for the cross stress. The Reynolds stress is obtained analytically from Çinlar random velocity field, which is based on vortex structures observed in the ocean at the subgrid scale. The validity of the model is tested with turbulent channel flow computed in OpenFOAM. It is compared with the most frequently used Smagorinsky and one-equation eddy SGS models through DNS data.