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Modeling the subfilter scalar variance for large eddy simulation in forced isotropic turbulence ADAM CHEMINET, Ecole Polytechnique, France, GUILLAUME BLANQUART, California Institue of Technology — Static and dynamic model for the subfilter scalar variance in homogeneous isotropic turbulence are investigated using direct numerical simulations (DNS) of a lineary forced passive scalar field. First, we introduce a new scalar forcing technique conditioned only on the scalar field which allows the fluctuating scalar field to reach a statistically stationary state. Statistical properties, including 2nd and 3rd statistical moments, spectra, and probability density functions of the scalar field have been analyzed. Using this technique, we performed constant density and variable density DNS of scalar mixing in isotropic turbulence. The results are used in an a-priori study of scalar variance models. Emphasis is placed on further studying the dynamic model introduced by G. Balarac, H. Pitsch and V. Raman [Phys. Fluids 20, (2008)]. Scalar variance models based on Bedford and Yeo's expansion are accurate for small filter width but errors arise in the inertial subrange. Results suggest that a constant coefficient computed from an assumed Kolmogorov spectrum is often sufficient to predict the subfilter scalar variance.

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