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Relating filtered and unfiltered quantities in large eddy simulation of turbulent combustion VENKATRAMANAN RAMAN, COLIN HEYE, The University of Texas at Austin — Large eddy simulation (LES) is currently recognized as a valuable tool for modeling turbulent combustion. Although significant advances have been made in the development of reliable models in LES, there remains considerable ambiguity regarding the fundamental definition of the methodology and its use for predicting measurable flow quantities. The root cause of these problems is the filtering operation used to obtain the LES governing equations. Here, we discuss the relation between filtered and unfiltered quantities through a probabilistic framework. Basic transformation rules to relate combustion-related quantities to mixture fraction or other such scalars are presented. Using a direct numerical simulation (DNS) of homogeneous isotropic turbulence, the importance of a missing modeling step is discussed.

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