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On Accounting for Initial Conditions in Models of Rayleigh-Taylor Turbulent Mixing BERTRAND ROLLIN, MALCOLM ANDREWS, Los Alamos National Laboratory — For many fluid engineering applications, considering only the fully developed turbulence regime with a rough estimate for the turbulence model initial conditions is not sufficient. If we consider for example Inertial Confinement Fusion (ICF), the turbulence and turbulent mixing induced by the Rayleigh-Taylor (RT) instability are subject to initial condition (IC) effects during the time of interest. The degree of confidence in any prediction of the flow evolution in the turbulence regime is therefore open to question. To improve our predictive capability, we need to capture the evolution of the instability from the initial state until it is appropriate to use a turbulence model, in particular with the treatment of ICs that seed the instability. We present our approach for tracking the growth of the RT mixing layer evolution. We have constructed a modal model based on several existing descriptions for single mode and multimode RT mixing evolution. We also present how to extract profiles of turbulence variables that are used as initial conditions for a turbulence model. Finally, we discuss a metric for switching from our modal model to the turbulence model.

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