Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Comparison Between Turbulence Model Initialization Approaches for Rayleigh-Taylor and Richtmyer-Meshkov Turbulent Mixing BERTRAND ROLLIN, NICK DENISSEN, JON REISNER, MALCOLM ANDREWS, Los Alamos National Laboratory — Implementation and validation cases of a novel approach to initialization for RANS simulations of interfacial instability induced by mixing are presented. The strategy consists of using an analytical model to compute the instability evolution from the quiescent state, and make use of its prediction to generate initial conditions for the turbulence model. Explicitly, an incompressible inviscid model for Rayleigh-Taylor and Richtmyer-Meshkov instabilities continuously updates the turbulence model variables values in the mixing layer, until the Reynolds number suggests that the flow has become turbulent. Implementation of this procedure is made in three steps: first, the instability model is run alone while the interface is evolved by the hydrocode hosting the turbulence model; second, the turbulence model is started and the turbulence variables updated in accordance with the instability growth model prediction; finally, the Reynolds number suggests that the turbulent mixing regime is reached, causing the instability model to stop and the turbulence model to continue alone. The initialization methodology is applied to Rayleigh-Taylor and Richtmyer-Meshkov problems. Comparisons between simulations using a traditional initialization technique and the new initialization approach are presented and discussed.

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Date submitted: 02 Aug 2013 Electronic form version 1.4