Reynolds-Averaged Navier–Stokes Modeling of Richtmyer–Meshkov Instability-Induced Mixing --- Oleg Schilling

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A high-order, multicomponent, weighted essentially nonoscillatory (WENO) implementation of a Reynolds-averaged Navier–Stokes model is used to simulate reshocked Richtmyer–Meshkov turbulent mixing at different Mach and Atwood numbers corresponding to various experiments. The predicted mixing layer evolutions are compared with the experimental data, as well as to analytical, late-time self-similar solutions of the transport equations. The physics of the terms in the transport equation budgets is discussed, and the terms are compared in detail to their self-similar profiles across the mixing layer. Additionally, the sensitivity of the turbulence model solutions to variations in the initial conditions and in the model coefficients is explored. The spatial and temporal convergence properties of the solutions are also explored. The limitations of the turbulence model predictions are discussed, together with potential theoretical improvements and motivations for new experimental measurements and simulations.