Numerical Investigation of Incompressible Richtmyer-Meshkov Instability WAYNE KRAFT, NICHOLAS MUESCHKE, MALCOLM ANDREWS, Texas A&M University, JEFFREY JACOBS, University of Arizona — The Richtmyer-Meshkov (RM) instability occurs when a shock passes through a perturbed interface separating fluids of different densities. Similarly, RM instabilities may also occur when a perturbed interface between two incompressible fluids of different density is impulsively accelerated. We report work that investigates RM instabilities between incompressible media through numerical simulations that are matched to experiments reported by Niederhaus & Jacobs (2003). In this work, we present a simplified set of initial conditions that may be used as an alternative to more complicated initial conditions, which require simulating impulse dynamics prior to instability growth. As an alternative an initial velocity impulse has been used to model the impulsive acceleration history found in the experiments of Niederhaus *et. al.* We report accurate simulation of the experimentally measured early-, intermediate-, and late-time penetrations of one fluid into another. In addition we find good agreement in structure morphology between the experiments of Niederhaus *et. al.* and our simulation. As a result, the initial conditions and results of this work can be used as a physical validation for a range of variable density, incompressible algorithms. We present such a validation for numerical code which solves the variable density Navier-Stokes equation.

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