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Analytical scalings of the linear Richtmyer-Meshkov instability.[1]
FRANCISCO COBOS, JUAN GUSTAVO WOUCHUK, ETSI Industriales - INEI and CYTEMA - Campus Universitario S/N - University of Castilla-La Mancha - Ciudad Real (13071) — In the linear Richtmyer-Meshkov instability (RMI), hydrodynamic perturbations are generated behind the transmitted and reflected rippled fronts. The contact surface reaches an asymptotic normal velocity and two different tangential velocities at each side, which are always different for moderate to strong levels of compression, depending on the amount of vorticity generated by the corrugated shocks. We show analytical scaling laws for the ripple velocity (δv_i^∞) in different physical limits and approximate formulas are provided, valid for arbitrary initial pre-shock parameters. An asymptotic growth for the contact surface ripple of the form $\psi_i(t) \approx \psi_\infty + \delta v_i^\infty$ t is obtained. The quantity ψ_∞ is in general different from the initial post-shock ripple amplitude, in agreement with the early finding of [1]. Comparison to simulations and experimental work is shown [2,3]. [1] K. A. Meyer and P. J. Blewett, Phys. Fluids **15**, 753 (1972). [2] F. Cobos Campos, and J. G. Wouchuk, Phys. Rev. E **93**, 053111 (2016). [3] F. Cobos-Campos, and J. G. Wouchuk, Phys. Rev. E **96**, 013102 (2017).

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