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Non-uniqueness of solutions in asymptotically self-similar shock reflections SEBASTIEN SM. LAU-CHAPDELAINE, MATEI I. RADULESCU, University of Ottawa — The present study numerically addresses the self-similarity of an unsteady shock reflection on an inclined wedge. The wedge-tip conditions are modified, allowing for a finite radius of curvature, and the following shock reflection configuration is observed at large distances from the tip. It is found that the type of shock reflection observed far from the corner, namely regular or Mach reflection, depends intimately on the wedge tip geometry, as the flow "remembers" how it was started. Substantial differences from a sharp-tipped wedge (without curvature) were found. For example, a shock with incident Mach number $M = 6.6$ and an isentropic exponent $\gamma = 1.2$ reflecting over wedge with a sharp tip will result in a Mach reflection when a wedge angle of 44° is used, while a 45° wedge will result in a regular reflection. This transition angle increases to between 57° and 58° when a wedge with a concave, curved tip is introduced. A vanishing length scale is introduced with the curved tip in a way which is similar to those of viscous and relaxation effects. While the length scale only dominates the solution at early times, this study shows that its effects play a dominant role in determining the asymptotic pseudo-steady shock reflection configuration.

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