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Modified geometrical shock dynamics applied to 2D shock wave focusing HENG LIU, Univ of California - San Diego, SHI QIU, Univ of Southern California, VERONICA ELIASSON, Univ of California - San Diego — Shock wave focusing can lead to extreme thermodynamic conditions, and applications have been extended to a variety of areas such as civil engineering and medical treatment. Our current study aims to deepen the understanding of shock focusing process by numerically investigating the interaction of multiple cylindrical shock waves. Solving the inviscid Euler equations can be computationally expensive due to requirements of high resolution at the shock focusing region. Therefore, in this study, the shock focusing scenario is solved using Geometrical Shock Dynamics (GSD) to help reduce the computational cost. The original theory of GSD is based on the assumption that the shock motion is independent from the flow conditions behind the shock front. However, this assumption is not valid for the expansion of cylindrical shock waves. Thus, a modified GSD method is proposed that takes into account the post-shock effects by coupling the post-shock flow conditions obtained from existing data into the original GSD equations. Several comparisons with Euler simulations are performed and the transition from regular to irregular reflection is also discussed.

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