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Shock Wave Reflection in a Non-Circular Inlet

Beric W. Skews, Jithin A. Mohan, Nankishore Menon

University of the Witwatersrand, South Africa

The flow between two finite wedges placed symmetrically in a supersonic flow with one or both sides capped with a semi-cone thereby forming a non-circular inlet is studied. In some cases one semi-cone is removed as an aid to visualisation and tunnel start-up. Imaging with laser vapour screen and shadowgraph techniques is conducted. The objective of the work is to examine transition between regular and Mach reflection in three-dimensional flows. The experimental results can give images that are difficult to interpret and which appear aphysical. Shocks appear to bifurcate and then rejoin on the symmetry plane; there is a very abrupt transition from the side conical incident wave to Mach reflection; and then a gradual reduction in stem height back to regular reflection. Clarity on these flows is obtained through further experimentation and CFD simulation.

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