

Numerical Simulations of Shock Wave Reflection over Double Wedges

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Key Words: *Shock waves, Double Wedges, Reflection, Mach Stem*

Shock wave reflection is a fundamental topic in aerodynamic research area and has a wide application in engineering. Three-dimensional shock reflections over two perpendicularly intersecting wedges are numerically investigated in this paper by using the finite volume method with the MUSCL-Hancock interpolation technique and self-adaptive unstructured mesh. Mach stem structures are demonstrated to be three-dimensional (3D) ones and have special configurations at different wedge angles. There are two different kinds of 3D Mach stem structures for the MR-RR interaction, namely the first and the second types of 3D Mach stem, respectively. The three-shock or four-shock configuration may occur in the intersecting corner for the MR-MR interaction. The four-shock one is consisting of the incident shock wave, the 3D Mach stem, the primary and secondary reflected shock waves. In the RR-RR interaction, the incident shock wave, the primary and secondary reflected shock waves meet at the same reflection point to combine a three-shock configuration.