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Calculation of stagnation streamline quantities in hypersonic blunt body flows. (English)

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Shock Waves 7, No. 1, 13-23 (1997).

Summary: An approximate method for the efficient calculation of stagnation-streamline quantities in hypersonic flows about spheres or cylinders is suggested. Based on the local similarity of the flow field, the two-dimensional Navier-Stokes equations are simplified to a one-dimensional approximation for the stagnation streamline. These equations are solved with an implicit finite-volume scheme. Comparisons with fully two-dimensional Euler and Navier-Stokes calculations for flows about spheres are presented, that include perfect gas flows and flows in chemical non-equilibrium. Comparisons with a number of experiments conclude this report.

MSC:

76K05 Hypersonic flows

76V05 Reaction effects in flows

76M25 Other numerical methods (fluid mechanics) (MSC2010)

Cited in 1 Document

Keywords:

spheres; cylinders; local similarity; Navier-Stokes equations; implicit finite-volume scheme; perfect gas flows; flows in chemical non-equilibrium

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