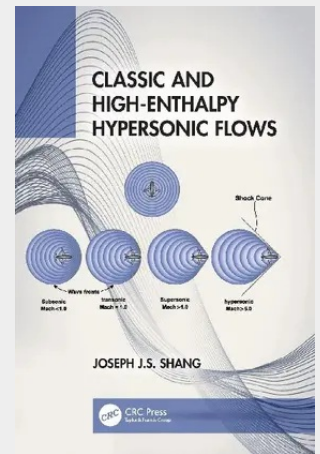


Classic and High-Enthalpy Hypersonic Flows

Classic and High-Enthalpy Hypersonic Flows presents a complete look at high-enthalpy hypersonic flow from a review of classic theories to a discussion of future advances centering around the Born-Oppenheimer approximation, potential energy surface, and critical point for transition. The state-of-the-art hypersonic flows are defined by a seamless integration of the classic gas dynamic kinetics with nonequilibrium chemical kinetics, quantum transitions, and radiative heat transfer. The book is intended for graduate students studying advanced aerodynamics and taking courses in hypersonic flow. It can also serve as a professional reference for practicing aerospace and mechanical engineers of high-speed aerospace vehicles and propulsion system research, design, and evaluation. Features - Presents a comprehensive review of classic hypersonic flow from the Newtonian theory to blast wave analogue. - Introduces nonequilibrium chemical kinetics to gas dynamics for hypersonic flows in the high-enthalpy state. - Integrates quantum mechanics to high-enthalpy hypersonic flows including dissociation and ionization. - Covers the complete heat transfer process with radiative energy transfer for thermal protection of earth reentry vehicle. - Develops and verifies the interdisciplinary governing equations for understanding and analyzing realistic hypersonic flows.

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