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New York, in 1962. Library of Congress Cataloging-in-Publication Data Names: Dorrance, William H., 1921-Title: Viscous hypersonic flow : theory of reacting and hypersonic boundary layers / William H. Dorrance. Description: Mineola, New York : Dover Publications, Inc., [2017] | This Dover edition, first published in 2017, is an unabridged republication of the work originally published by the McGraw-Hill Book Company, Inc.,

Viscous hypersonic flow : theory of reacting and ...

For hypersonic flow, the shock layers are thin and viscous. The boundary layer thickness is proportional to the square of the Mach number. This sometimes results in the situation pictured in the diagram above where the shock and boundary layers are the same thickness. Viscous Effects and Pressure Differential

Theory of Hypersonic Flight

In aerodynamics, a hypersonic speed is one that greatly exceeds the speed of sound, often stated as starting at speeds of Mach 5 and above. The precise Mach number at which a craft can be said to be flying at hypersonic speed varies, since individual physical changes in the airflow occur at different speeds; these effects collectively become important around Mach 5-10. The hypersonic regime can also be alternatively defined as speeds where specific

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heat capacity changes with the temperature of t

Hypersonic speed - Wikipedia

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Viscous Hypersonic Flow: Theory of Reacting and Hypersonic ...

Continuum mechanics provide the basis for describing unsteady turbulent hypersonic flows of compressible viscous fluids, as they would occur on the fuselage of future aerospace planes flying above 90 kms altitude. The corresponding balance equations are the Favre-averaged Navier-Stokes equations with Fourier's law for heat transfer. Additional equations are necessary for the Reynolds stresses, the turbulent dissipation and other heat flux correlations.

Hypersonic Flows - an overview | ScienceDirect Topics

In particular, this book is concerned with viscous-gas-flow problems involving reacting gas mixtures. Starting from the statement of the boundary-layer equations for a mixture of gases, the theory is developed for both the laminar and turbulent boundary layers.

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Full E-book Viscous Hypersonic Flow: Theory of Reacting and Hypersonic Boundary Layers Review - video dailymotion. <https://ni.readpdfonline.xyz/?book=048681288X>This frequently cited text addresses theories for treating the laminar and turbulent boundary layers of reacting gas mixtures. The theories are developed from fundamentals, and all related chemical, thermodynamic, and physical concepts are described in a fashion that provides a self-contained treatment.

Full E-book Viscous Hypersonic Flow: Theory of Reacting ...

Abstract. Stewartson's theory for axisymmetric hypersonic flow of a model gas over slender bodies with strong viscous interaction and strong shock wave is extended to power-law viscosity variation and Prandtl numbers other than one. Flow properties at the body surface and shock are obtained without recourse to numerical integration.

Axisymmetric hypersonic flow with strong viscous ...

In the 1970s, the term generally came to refer to speeds of Mach 5 (5 times the speed of sound) and above. The hypersonic regime is a subset of the supersonic regime. Hypersonic flow is characterized by high temperature flow behind a shock wave, viscous interaction, and chemical dissociation of gas. Associated terminology

Aerodynamics - Wikipedia

Viscous Hypersonic Flow: Theory of Reacting and Hypersonic Boundary Layers: Dorrance, William: Amazon.sg: Books

Viscous Hypersonic Flow: Theory of Reacting and Hypersonic ...

The accurate stagnation point heat transfer prediction is one of the most outstanding achievements by the classical viscous hypersonic flow theory. The compressible boundary-layer formulation of a chemical reaction and dissociating air is reduced to the incompressible Falkner-Skan equations by a combination of compressibility [ 13 ], coordinates transformations [ 14 ], and aerodynamic similarity parameters.

High-enthalpy hypersonic flows | Advances in Aerodynamics ...

Abstract. Solutions are obtained for hypersonic viscous interaction along a flat plate in the presence of strong boundary-layer blowing, with inverse-square-root injection velocity, for laminar flow over a cold wall and with a power-law viscosity-temperature relation. In the strong-interaction region, self-similarity is preserved if the blowing is such that the thicknesses of the inviscid shock layer, viscous shear layer, and inviscid blown layer all have the same order of magnitude.

Hypersonic viscous interaction with strong blowing ...

Dorrance, W. H. (1962) Viscous Hypersonic Flow. Theory of Reacting and Hypersonic Boundary Layers, McGraw-Hill, New York. Echert, E. R. G. and Drake, R. M. (1972) Analysis of Heat and Mass Transfer, McGraw-Hill, New York.

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