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The Theory of Viscous Hypersonic Flow | Annual Review of ...

Hypersonic flows are flow fields where the fluid velocity is much larger than the velocity of propagation of small disturbances, the velocity of sound. Th. von Kármán has pointed out that in many ways the dynamics of hypersonic flows is similar to Newton's corpuscular theory of aerodynamics.

Hypersonic Flows - an overview | ScienceDirect Topics

Hypersonic Flow Theory presents the fundamentals of fluid mechanics, focusing on the hypersonic flow theory and approaches in theoretical aerodynamics. This book discusses the assumptions underlying hypersonic flow theory, unified supersonic-hypersonic similtude, two-dimensional and axisymmetric bodies, and circular cylinder.

Hypersonic Flow Theory - 1st Edition

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 - Hypersonic Flight

Hypersonic flow can be approximately separated into a number of regimes. The selection of these regimes is rough, due to the blurring of the boundaries where a particular effect can be found. Perfect gas. In this regime, the gas can be regarded as an ideal gas. Flow in this regime is still Mach number dependent.

Hypersonic speed - Wikipedia

Nearly all illuminating classic hypersonic flow theories address aerodynamic phenomena as a perfect gas in the high-speed range and at the upper limit of continuum gas domain. The hypersonic flow...

(PDF) High-enthalpy hypersonic flows

Hypersonic flow is a high energy flow. The ratio of kinetic energy to the internal energy of the gas increases as the square of the Mach number. When this flow enters a boundary layer, there are high viscous effects due to the friction between air and the high-speed object.

Hypersonic flight - Wikipedia

In Hypersonic Viscous Flows Wen-Lan Wang* and Iain D. Boyd* Department of Aerospace Engineering University of Michigan, Ann Arbor, MI 48109 Abstract This paper presents a study of the breakdown of the Navier-Stokes equations in hypersonic viscous flows over a sharp cone tip and a hollow cylinder/flare ge-ometry.

Continuum breakdown in hypersonic viscous flows

The theory of viscous hypersonic flow. Annu. Rev. Fluid Mech. 3, 371-396 (1971) ADS CrossRef Google Scholar 25. Cheng, H.K.: Perspectives on hypersonic viscous flow research.

Introduction to Hypersonic Flows | SpringerLink

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Hypersonic compression corner flow with large separated ...

Hypersonic flow theory: Inviscid flows, Volume 1, 1966, 602 pages, Wallace D. ... and updated treatment of inviscid and laminar viscous compressible flows from a theoretical viewpoint. It. Water in synthetic fuel production the technology and alternatives, Ronald F. Probst, Harris

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