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Study of Some Problems in Gaseous Media

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Abstract

The study of physical and mathematical problems in gaseous media plays an important role in understanding the behaviors of gases under different environmental and applied conditions. Gaseous systems are influenced by several factors, including pressure, temperature, density, viscosity, diffusion, thermal conductivity, and chemical reactions. This study focuses on selected problems associated with the transport, flow, and interaction of gases and aims to develop mathematical and analytical approaches for describing their behaviors. Particular attention is given to the governing equations of fluid motion, heat transfer, mass diffusion, and energy conservation in gaseous media. Appropriate assumptions and boundary conditions are considered to simplify complex physical situations and obtain meaningful solutions. The study also examines how variations in physical parameters affect gas flow, temperature distribution, concentration profiles, and stability characteristics. Mathematical modeling and analytical techniques provide useful tools for investigating phenomena such as diffusion, convection, compressible flow, heat transfer, and pollutant dispersion. The results obtained from such models can contribute to a better understanding of gaseous systems and their practical applications in environmental science, industrial processes, atmospheric studies, and engineering. Overall, the study demonstrates the importance of mathematical and physical analysis in addressing problems involving gaseous media and provides a framework for developing more accurate and efficient models for complex gas-dynamic phenomena.

Keywords: Gaseous media, mathematical modeling, gas flow, diffusion, convection, heat transfer, mass transfer, fluid dynamics, compressible flow, transport phenomena.