

## DOCTORAL THESIS

S.L.Sarin: Application of Gaskinetics to Some Flow Problems,\*  
Thesis Technological University Delft, 1968, 59 pages.

### Author's Summary:

The object of this thesis is the development of new techniques for solving the Boltzmann equation and their applications to certain flow problems. A monatomic and single-component gas is considered.

Preliminary remarks are given in chapter 1. They deal in a cursory manner with the historical aspects and the aims of the kinetic theory of gases. Plan of the thesis is also outlined in this chapter.

Chapter 2 deals with the general introduction of the existing techniques for solving the Boltzmann equation. The various techniques for solving the Boltzmann equation have been categorized only under five heads. Comments regarding their applicability are added, wherever necessary.

The collision of gas clouds is considered in chapter 3. The general expressions for the density and the temperature rise are evaluated during the collision process. The results for the collision of two clouds with equal densities are deduced from the general results.

Chapter 4 consists of two parts. Part I deals with the presentation of a new form of the distribution function and its possible applications to problems in kinetic theory of gases. Part II is an illustration of its application to linearized plane couette flow.

Chapter 5 deals with the problem of kinetic theory of shock structure. Only weak shock is considered. A system of three singular, non-linear integral equations is derived for density, temperature and average velocity by using BGK model. The equations are expressed in terms of the small parameter and their simplification leads to differential equations. The calculations are carried upto the first approximation.

\* Requesters may obtain copies of this thesis from the author.

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