CONTENTS

VOLUME 1

I. KINETIC THEORY AND STATISTICAL MECHANICS	
Global Solution for the Discrete Boltzmann Equation (Invited Paper)	3
The Problems of Kinetic Theory of Gases (Invited Paper)	19
Asymptotic Methods of the Boltzmann Equation Solution (Invited Paper)	39
Kinetic Theory and Turbulence (Invited Paper)	51
Onsager's Principle for the Stationary Boltzmann Equation	67
The Elements of the Exact Theory of the Nonlinear Boltzmann Equations for Maxwell Molecules and Some Applications to the Rarefied Gas Dynamics	75
A New Boundary Phenomenon in Kinetic Theory	83

Relations of Symmetry and Reciprocity in Linear Kinetic Theory of Gases	91
Stochastic Theory of Thermal Fluctuations in Nonequilibrium Systems	99
Kinetic Equations of High Nonequilibrium Dense Gas	107
Kinetic Theory of Irreversible Processes in Two-Temperature and Two-Velocity Gas Mixtures	115
On the Kinetic Theory of Dense Gases	123
II. RELAXATION GAS DYNAMICS	
Physical Models of Gas Dynamics with Relaxational Effects (Invited Paper)	133
Modern Problems of Relaxation Gas Dynamics (Invited Paper)	145
Methods of Obtaining Hydrodynamic Equations of Motion of Complicated Media and Their Boundary Conditions on the Basis of Kinetic Equations (Invited Paper)	161
High Energy Molecules in Gas Dynamics	177
Transport Terms in Gases Dominated by V-V Exchanges: Application to Boundary-Layer Flows	185
Rotational-Vibrational Relaxation in the Burnett Approximation	193

To the Nonequilibrium Effects in Dynamics of Chemically Reacting and Relaxing Gas Mixtures	199
On the Contribution of Radiation and Nonequilibrium Chemical and Photochemical Processes in the Hydrodynamical Equations Applicable to Aeronomy	205
The Kinetic Models of Vibration Relaxation of Polyatomic Molecules E.A. Nagnibeda and M.A. Rydalevskaya	213
III. ANALYTICAL METHODS	
Application of the Expansion in Maxwellians to the Solution of Temperature Relaxation Problems A.Ya. Ender and I.A. Ender	221
Nonlocal Hydrodynamical Models of Gas Flows in the Transition Regime	229
Degeneration of the Chapman-Enskog Expansion in One-Dimensional Motions of Maxwellian Molecule Gases	237
Group Symmetry of the Collision Integral Applied to Moment Method Solutions of Kinetic Equations	245
Structure of a Shock Wave in a Rarefied Gas V.Yu. Velikodnyi, G.A. Korolokov, and A.V. Orlov	253
IV. NUMERICAL METHODS	
The Problem on Point Intense Explosion in Rarefied Gas V.V. Aristov and E.M. Shakov	261
The Kinetic Numerical Method for Rarefied and Continuum Gas Flows	269

Numerical Solution to the Boltzmann Equation by the Integral Approximation Method 27 E.F. Limar	7
Numerical Solution of the Boltzmann Equation for One-Dimensional Problems in Binary Mixtures 28 P. Mausbach and A.E. Beylich	35
Time-Dependent Approach to Kinetic Analyses of Two-Dimensional Rarefied Gas Flows	3
Solution of the Boltzmann Equation for Plane Rarefied Gas Dynamic Problems)3
V. MONTE-CARLO SIMULATION	
Direct Monte-Carlo Simulation of Aerohydrodynamics Problems (Invited Paper)	۱3
New Possibilities and Applications of Monte-Carlo Methods (Invited Paper)	33
Rarefied Hypersonic Flow Past a Slender Sharp Cone 34 G.A. Bird	19
Monte-Carlo Procedure for the Solution of Rarefied Gas Dynamics Problems	57
A Direct Simulation Monte-Carlo Method in Kinetic Evaporation-Condensation Problems	53
Methods of Statistical Modelling and Direct Numerical Integration of Kinetic Equations of Gas Theory: Development and Application to Problems of Rarefied Gas Dynamics	71
VI. AERODYNAMIC PROBLEMS	
Low Density Aerodynamics of Satellites (Invited Paper)	35

Problems of Rarefied Gas Aerodynamics in Full-Scale Experiments (Invited Paper)	401
A Force on a Circular Cylinder in a Highly Rarefied Gas Bounded by a Plane Wall	413
Drag, Heat Flux, and Recovery Factor Measurements in Free Molecular Hypersonic Flow and Gas-Surface Interaction Analysis	421
Local Methods in Rarefied Gas Dynamics	431
Drag of a Sphere in Low-Speed Rarefied Flows- Towards Numerical Estimates of Upper and Lower Bounds R.J. Cole	439
Wall Temperature Effects on Rarefied Hypersonic Cone Drage	453
The Effect of Rarefaction on Impact Pressure Measurements in Supersonic Flows	461
Slightly Rarefied Low Reynolds Number Flow Past Solid Surfaces with Reduced Momentum and Energy Transfer B. Gampert	469
Porous Media in Aerodynamic Test at Low Reynolds Numbers V.N. Gusev and Yu.V. Nikolsky	477
An Approximate Method of Aerodynamics Calculation of Complex Shape Bodies in a Transition Region V.M. Kotov, E.N. Lychkin, A.G. Reshetin, and A.N. Schelkonogov	487
Experimental Study of Normal and Tangential Stresses on the Surface of Simple Shape Bodies in Rarefied Flows	495
Aerodynamics Problems of Space Probes in Comet Atmosphere	503

VII. EXTERNAL FLOWS

Qualitative Features of a Rarefied Gas Flow about Simple Shape Bodies	515
Numerical Study of the Trailing Edge Region in Slip Flow Regime	523
Investigation of Structural Features of Rarefied Gas Flows about a Sphere Using Navier-Stokes Equations	535
VIII. FLOWS NEAR SURFACES AND KNUDSEN LAYERS	
Transport Processes in Knudsen Layers (Invited Paper) M.N. Kogan	545
On the Rayleigh Problem with Specular and Diffuse Reflection at the Wall	561
Plane Couette Flow in a Strong Pseudo-Centrifugal Field	569
Theoretical and Experimental Investigation of the Knudsen Layer Produced by Intensive Evaporation of Iodine	577
Wall Effects on a Heated Plate in a Semi-Infinite Expanse of a Highly Rarefied Gas	585
Internal Flow with Slip: Some Gas Dynamic Aspects A.K. Sreekanth and E. Rathakrishnan	595
Non-Equilibrium Behavior in the Knudsen Layer near a Condensing Interphase Boundary	605
IX. GAS-SURFACE INTERACTIONS	
Thermal Accommodation of Gases on Solid Surfaces- Description of Experimental Methods and of Some Recently Completed Investigations (Invited Paper) L.B. Thomas	621

An	Iterative Solution to the Surface Scattering Problem: Application to He Diffraction by Cu	637
	alytical Studies of Gas-Surface Interaction	645
•	asiclassical Theory of Vibrational-Rotational Excitation and Adsorption of Molecular Gas by Crystalline Surface	653
H- <i>P</i>	Atom Beam Scattering from a Ni (110) Surface Covered with a c(2x2) Carbon Layer	661
Exp	perimental Determination of Momentum Transfer Coefficients in Hypersonic Free Molecular Flow and Distribution Function Recovery of Reflected Molecules	669
Воц	unds of Linear Transter and Accommodation at the Gas-Solid Interface	677
Son	me Aspects of Nonequilibrium Free Molecular Nitrogen Flow-Metal Surface Interaction	. 687
	VOLUME 2	
	X. COLLISIONAL PROCESSES	
Ana	nalytical Formulae for Cross Sections and Rate Constants of Elementary Processes in Gases	. 697
Re	Plaxation of Velocity Distribution of Electrons Cooled (Heated) by Rotational Excitation (De-Excitation) of N ₂	. 705
Efi	fects of the Initial Molecular States in High-Energy Scattering of Molecular Beams	. 717