

Series on Advances in Mathematics for Applied Sciences – Vol. 9

**Nonlinear Kinetic Theory
and Mathematical
Aspects of
HYPERBOLIC
SYSTEMS**

Rapallo, Genova, Italy

April 12–16, 1992

Editors

Vinicio C. Boffi

University of Rome "La Sapienza"

Franco Bampi

University of Genova

Giuseppe Toscani

University of Ferrara

Quaderno CNR–Gruppo Nazionale per la Fisica Matematica



World Scientific

Singapore • New Jersey • London • Hong Kong

CONTENTS

Organizing Committee	v
Preface	vii
Numerical Approximation of the 1-D Nonlinear Drift-Diffusion Model in Semiconductors <i>F. Arimburg, C. Baiocchi & L. D. Marini</i>	1
Mathematical Biology and Kinetic Theory Evolution of the Dominance in a Population of Interacting Organisms <i>N. Bellomo & M. Lachowicz</i>	11
Formation of Maxwellian Tails <i>A. V. Bobylev</i>	21
Radiative Transfer in Fragmented Interstellar Clouds <i>P. Boisse</i>	28
On the Discrete Velocity Models of the Enskog Equation <i>G. Borgioli, G. Lauro & R. Monaco</i>	38
Bubble Functions and Stabilization of Time Dependent Problems <i>F. Brezzi & A. Russo</i>	48
Electron Runaway: Some Mathematical Studies <i>G. Busoni & G. Frosali</i>	56
Recent Results on a Self-Adaptive Formulation for the Elliptic/Hyperbolic Coupling <i>C. Canuto & A. Russo</i>	68
Quantitative Entropy Production Bounds for the Boltzmann Equation <i>E. A. Carlen & M. C. Carvalho</i>	80
On a Class of Discrete Models of Gases with Different Moduli <i>P. Chauvat & R. Gatignol</i>	90

Convergence to Equilibrium in Various Situations for the Solution of the Boltzmann Equation <i>L. Desvillettes</i>	101
On Long Time Asymptotics of the Vlasov-Poisson-Boltzmann System <i>J. Dolbeault</i>	115
Differential Formulation and Finite Element Discretization of 3D Eddy Current Problems <i>P. Fernandes</i>	124
Reduction Techniques for a Class of Nonlinear Models of Interest in Wave Propagation <i>D. Fusco & N. Manganaro</i>	134
Numerical Approach to Kinetic Problems with Temperature <i>E. Gabetta</i>	140
A Note on Continuum Limits of Interacting Particle Systems <i>J. M. Greenberg & R. Peszek</i>	147
Random Discrete Velocity Models: Possible Bridges between the Boltzmann Equation, Discrete Velocity Models and Particle Simulation? <i>R. Illner & S. Rjasanow</i>	152
On the Enskog Equation and Its Hydrodynamic Limit <i>M. Lachowicz</i>	159
Point Vortices in Euler Flows <i>C. Marchioro</i>	166
The Classical Limit of a Self-Consistent Quantum-Vlasov Equation in 3-D <i>P. A. Markowich & N. J. Mauser</i>	171
Velocity Averaging for Boundary Value Problems <i>A. Palczewski</i>	179
The Kinetic Approach to Multidimensional Relativistic Gas Dynamics <i>B. Perthame</i>	187

An H-Theorem for the Kinetic Equation of Simple Reacting Spheres <i>J. Polewczak & G. Stell</i>	196
Simple Balance Methods for Transport in Stochastic Mixtures <i>G. C. Pomeraning</i>	204
Knudsen Layer Analysis by the Semicontinuous Boltzmann Equation <i>L. Preziosi</i>	212
Balance Laws Systems and Non Equilibrium Thermodynamics <i>T. Ruggeri</i>	223
Remarks on a Self Similar Fluid Dynamic Limit for the Broadwell System <i>M. Slemrod & A. E. Tzavaras</i>	233
On Extended Kinetic Theory with Chemical Reaction <i>G. Spiga</i>	242
On Shock Wave Stability <i>A. Szepessy</i>	253
Stability and Exponential Convergence in L^p for the Spatially Homogeneous Boltzmann Equation <i>B. Wennberg</i>	258