

# Table of Contents

Preface ..... v

## **Kinetic problems**

Introduction by *S. Cordier, T. Goudon and E. Sonnendrücker* ..... 3

*R. Barthelmé and C. Parzani*

Numerical charge conservation in Particle-In-Cell codes ..... 7

*J.-P. Chehab, A. Cohen, D. Jennequin, J. J. Nieto, Ch. Roland and J. Roche*

An adaptive Particle-In-Cell method using multi-resolution analysis ..... 29

*M. Campos Pinto and M. Mehrenberger*

Adaptive numerical resolution of the Vlasov equation ..... 43

*N. Crouseilles and F. Filbet*

A conservative and entropic method for the Vlasov–Fokker–Planck–Landau equation ..... 59

*C. Besse, N. J. Mauser and H. P. Stimming*

Numerical studies for nonlinear Schrödinger equations:  
the Schrödinger–Poisson- $X\alpha$  model and Davey–Stewartson systems ..... 71

*C. Besse, J. Claudel, P. Degond, F. Deluzet, G. Gallice and C. Tessieras*

Ionospheric plasmas: model derivation, stability analysis  
and numerical simulations ..... 101

*L. Gosse*

A case study on the reliability of multiphase WKB approximation  
for the one-dimensional Schrödinger equation ..... 131

**Hyperbolic problems**

Introduction by <i>B. Després</i> .....	145
<i>C. Baranger, G. Baudin, L. Boudin, B. Després, F. Lagoutière, E. Lapébie and T. Takahashi</i>	
Liquid jet generation and break-up .....	149
<i>B. Després, S. Jaouen, C. Mazeran and T. Takahashi</i>	
Numerical study of a conservative bifluid model with interpenetration .....	177
<i>F. Caro, F. Coquel, D. Jamet and S. Kokh</i>	
DINMOD: A diffuse interface model for two-phase flows modelling .....	209
<i>F. Coquel, D. Diehl, C. Merkle and C. Rohde</i>	
Sharp and diffuse interface methods for phase transition problems in liquid-vapour flows .....	239
<i>J. Cartier and A. Munnier</i>	
Geometric Eddington factor for radiative transfer problems .....	271
<i>M. Dumbser and C.-D. Munz</i>	
Arbitrary high order discontinuous Galerkin schemes .....	295
<i>C.-D. Munz, M. Dumbser and M. Zucchini</i>	
The multiple pressure variables method for fluid dynamics and aeroacoustics at low Mach numbers .....	335