

Contents

1	Gas of Point Particles	1
1.1	General Equations and Results	1
1.1.1	Infinite Volume Gibbs States	3
1.1.2	Choice of the Initial Data	7
1.2	Infinite Dynamics in One Dimension: Existence and Long Time Behavior	8
1.3	Runaway Effects for Bounded Body/Medium Interactions in One Dimension	19
1.3.1	The Quasi-One-Dimensional Model	19
1.3.2	The One-Dimensional Model: Violation of Ohm's Law	30
1.3.3	Higher Dimensions and Open Problems	40
	References	41
2	Vlasov Approximation	43
2.1	Motivation	43
2.2	A Necessary Condition for a Friction Model	47
2.3	On Bounded Interactions	52
2.4	Heuristic Analysis of Singular Interactions	56
	References	60
3	Motion of a Body Immersed in a Vlasov System	63
3.1	Hard Core Interactions and Approach to the Stationary State	63
3.1.1	Model and Results	65
3.1.2	Proof of Theorem 3.1	71
3.1.3	Comments	79
3.2	More General Shapes and Non-rigid Bodies	80
3.2.1	Convex Body	80
3.2.2	Elastic Body	84
3.3	Diffusive Boundary Conditions	90
3.4	Open Problems	95
	Appendix	96
	References	99

4 Motion of a Body Immersed in a Stokes Fluid	101
4.1 Position of the Problem	101
4.2 Rectilinear Motion.....	103
4.3 Rotary Motion	106
Appendix	111
References	115
A Infinite Dynamics	117
A.1 Time Evolution of Infinitely Many Particles Systems	117
A.2 Vlasov Equation with Infinite Mass	128
References	132

Mathematical Models of Viscous Friction

Buttà, P.; Cavallaro, G.; Marchioro, C.

2015, XIV, 134 p. 5 illus., Softcover

ISBN: 978-3-319-14758-1