

Contents

Foreword	vii
Chapter 1: Review of Basic Classical Mechanics	
1. Newtonian Mechanics of a System of Particles	1
2. Hamilton-Lagrange Equations of Motion	6
3. Integrable Dynamical Systems	15
4. Non-Integrable Systems	31
5. The KAM Theorem	51
6. A Few Examples of Non-Integrable Systems	62
7. The Non-Existence of Integrals of Motion near Homoclinic Orbits and Statistical Behavior	86
8. Stability of Dynamical Systems	107
9. Strange Attractors and Chaos	123
Chapter 2: Probability and Mechanics	
1. The Gibbs Ensemble	165
2. Instability	182
3. Connection with Thermodynamics	195
Chapter 3: Elements of Probability Theory	
1. Measures in a Vector Space	210
2. Probability Distributions	212

3. Random Variables	217
4. Characterization of a Probability Distribution	219
5. Stochastic Independence of Random Variables	228
6. Convergence of Probability Distributions and Random Variables	235

Chapter 4: Elements of Random Processes Theory

1. Markov Chains	242
2. Spectral Analysis of Stochastic Matrices	247
3. Asymptotics	259
4. Stationary Random Processes of Second Order	262

Chapter 5: A Few Elements of Quantitative Information Theory

1. The Amount of Information	280
2. Basic Properties of the H function	290

Appendix

The Inequality of the Arithmetic and Geometric Means	300
--	-----

References	306
------------	-----

Subject Index	313
---------------	-----