

Ivar Ekeland

Convexity Methods in Hamiltonian Mechanics



Springer-Verlag
Berlin Heidelberg New York
London Paris Tokyo Hong Kong

Table of Contents

Chapter I. Linear Hamiltonian Systems	1
1. Floquet Theory and Stability	1
2. Krein Theory and Strong Stability	7
3. Time-Dependence of the Eigenvalues of $R(t)$	15
4. Index Theory for Positive Definite Systems	23
5. The Iteration Formula	34
6. The Index of a Periodic Solution to a Nonlinear Hamiltonian System	54
7. Examples	65
8. Non-periodic Solutions: The Mean Index	74
Chapter II. Convex Hamiltonian Systems	79
1. Fundamentals of Convex Analysis	79
2. Convex Analysis on Banach Spaces	86
3. Integral Functionals on L^α	93
4. The Clarke Duality Formula	98
Chapter III. Fixed-Period Problems: The Sublinear Case	110
Introduction	110
1. Subquadratic Hamiltonians	111
2. An Existence Result	117
3. Autonomous Systems	121
4. Nonautonomous Systems	129
5. Other Problems	133
Chapter IV. Fixed-Period Problems: The Superlinear Case	136
Introduction	136
1. Mountain-Pass Points	136
2. A Preliminary Existence Result	148
3. The Index at Mountain-Pass Points	157

4. Subharmonics	171
5. Autonomous Problems and Potential Wells	175
Chapter V. Fixed-Energy Problems	187
Introduction	187
1. Existence, Length, Stability	187
2. Multiplicity in the Pinched Case	198
3. Multiplicity in the General Case	215
4. Open Problems	235
Bibliography	237
Index	245