

TABLE OF CONTENTS

Preface	vii
Lectures on Dynamical Systems Sheldon E. Newhouse	1
Bifurcations of Dynamical Systems John Guckenheimer	115
Various Aspects of Integrable Hamiltonian Systems Jürgen Moser	233

Lectures on Dynamical Systems *

Sheldon E. Newhouse
University of North Carolina, Chapel Hill

Contents

Introduction	2
1. Periodic points, flows, diffeomorphisms, and generic properties	4
2. Hyperbolic sets and homoclinic points	13
3. Homoclinic classes, shadowing lemma and hyperbolic basic sets	25
4. Hyperbolic limit sets	36
5. Attractors-topology	51
6. Attractors-ergodic theory	62
7. The measure μ_Λ	74
8. Diffeomorphisms with infinitely many attractors	88
References	111

* Partially supported by N.S.F. Grant MCS 76-05854.

VARIOUS ASPECTS OF INTEGRABLE HAMILTONIAN SYSTEMS (*)

J. Moser

Courant Institute of Mathematical Sciences, New York University

Contents

1. Integrable System, Basic Facts and Examples	233
2. Examples of Integrable Systems, Isospectral Deformations	237
3. Reduction of Hamiltonian Systems with Symmetries	241
4. The Inverse Square Potential	251
5. Extension of Geodesic Flow	259
6. Geodesics on an Ellipsoid	265
7. An Integrable System on the Sphere	270
8. Hill's Equation	277

1. Integrable Hamiltonian Systems

(a) In these informal lecture notes we discuss a number of integrable Hamiltonian systems which have surfaced recently in very different connections. It is our goal to discuss various aspects underlying the integrability of a system like that of group representation, isospectral deformation and geometrical considerations. Since this subject is still far from being understood or being systematic we discuss a number of examples which are seemingly disconnected. In fact, there are some rather unexpected connections

(*) Partially supported by National Science Foundation Grant MCS 77-01986.