

Contents

Preface	vii
Part 1. Differentiable Dynamical Systems	1
1. Manifolds	1
2. Differentiable Dynamics	4
3. Vector Fields	9
4. Fixed Points and Periodic Orbits. Poincaré Map	13
5. Hyperbolic Fixed Points and Periodic Orbits	18
6. Stable and Unstable Manifolds	26
7. Center Manifolds	32
8. Attractors, Bifurcations, Genericity	37
Note	47
Problems	48
Part 2. Bifurcations	55
9. Bifurcations of Fixed Points of a Map	55
10. Bifurcation of Periodic Orbits. The Case of Semiflows	62
11. The Saddle-Node Bifurcation	64
12. The Flip Bifurcation	67
13. The Hopf Bifurcation	74
14. Persistence of Normally Hyperbolic Manifolds	88
15. Hyperbolic Sets	94
16. Homoclinic and Heteroclinic Intersections	106
17. Global Bifurcations	118
Note	122
Problems	123

Part 3. Appendices	131
A. Sets, Topology, Metric, Banach Spaces	131
B. Manifolds	138
C. Topological Dynamics and Ergodic Theory	151
D. Axiom A Dynamical Systems	154
References	172
Index	183