

---

## Contents

	Preface	vii
0	Preliminaries and notation	1
1	Differential calculus	9
	1 Fréchet and Gâteaux derivatives	9
	2 Continuity and differentiability of Nemitski operators	15
	3 Higher derivatives	23
	4 Partial derivatives, Taylor's formula	26
2	Local inversion theorems	30
	1 The Local Inversion Theorem	30
	2 The Implicit Function Theorem	36
	3 A stability property of orbits	38
3	Global inversion theorems	45
	1 The Global Inversion Theorem	45
	2 Global inversion with singularities	55
	<i>Appendix</i>	60
4	Semilinear Dirichlet problems	61
	1 Problems at resonance	62
	2 Problems with asymmetric nonlinearities	71
5	Bifurcation results	79

	1	Introduction	79
	2	Some elementary examples	82
	3	The Lyapunov–Schmidt reduction	89
	4	Bifurcation from the simple eigenvalue	91
	5	A bifurcation theorem from a multiple eigenvalue	101
		<i>Appendix</i>	104
6		Bifurcation problems	107
	1	The rotating heavy string	107
	2	The Bénard problem	112
	3	Small oscillations for second-order dynamical systems	119
	4	Water waves	123
	5	Periodic solutions of a semilinear hyperbolic equation	130
7		Bifurcation of periodic solutions	136
	1	The Hopf bifurcation	136
	2	Nonlinear oscillations of autonomous systems	139
	3	The Lyapunov Centre Theorem	145
	4	The restricted three-body problem	153
		Problems	160
		Bibliography	165
		Index	170