

# Contents

Preface vii

## *Part I Bifurcation Theory* 1

- 1 Spontaneous symmetry breaking: mathematical methods, applications and problems**  
D. H. Sattinger 3
- 2 Branches of solutions in nonlinear eigenvalue problems**  
N. Bazley and T. Küpper 24
- 3 Bifurcation of non-periodic solutions of some semilinear equations in unbounded domains**  
K. Kirchgässner and J. Scheurle 41
- 4 Two new bifurcation phenomena**  
H. B. Keller 60

## *Part II Applications of Bifurcation Theory* 75

- 5 Perturbed bifurcations and crystal spectra**  
T. Poston 77
- 6 The behaviour of solutions lying on an invariant 2-torus arising from the bifurcation of a periodic solution**  
G. Iooss and D. D. Joseph 92
- 7 Applications of group representations to the buckling of spherical shells**  
G. H. Knightly and D. Sather 115

- 8 An approximate model for the liquid to crystal phase transition**  
C. A. Stuart 139
- Part III Waves and Diffusion* 181
- 9 On solitary waves and their role in the evolution of long waves**  
J. L. Bona 183
- 10 Wave-fronts and target patterns**  
P. C. Fife 206
- 11 The porous media equation**  
L. A. Peletier 229
- Part IV Special Applications* 243
- 12 Global analysis of problems from nonlinear elastostatics**  
S. S. Antman 245
- 13 Some free boundary problems in plasma physics and fluid mechanics**  
H. Berestycki 271
- 14 Recent progress on the nonlinear Hartree–Fock, concentration–diffusion, and Navier–Stokes equations**  
K. Gustafson 296
- 15 Nonlinear analysis of simple metabolic control circuits**  
J. J. Tyson 310
- Index 323