



## TABLE OF CONTENTS

	Page
<b>CHAPTER 1. INTRODUCTION TO CENTRE MANIFOLD THEORY . . .</b>	<b>1</b>
1.1. Introduction . . . . .	1
1.2. Motivation . . . . .	1
1.3. Centre Manifolds . . . . .	3
1.4. Examples . . . . .	5
1.5. Bifurcation Theory . . . . .	11
1.6. Comments on the Literature . . . . .	13
<b>CHAPTER 2. PROOFS OF THEOREMS . . . . .</b>	<b>14</b>
2.1. Introduction . . . . .	14
2.2. A Simple Example . . . . .	14
2.3. Existence of Centre Manifolds. . . . .	16
2.4. Reduction Principle. . . . .	19
2.5. Approximation of the Centre Manifold . . . . .	25
2.6. Properties of Centre Manifolds . . . . .	28
2.7. Global Invariant Manifolds for Singular Perturbation Problems. . . . .	30
2.8. Centre Manifold Theorems for Maps. . . . .	33
<b>CHAPTER 3. EXAMPLES . . . . .</b>	<b>37</b>
3.1. Rate of Decay Estimates in Critical Cases. .	37
3.2. Hopf Bifurcation . . . . .	39
3.3. Hopf Bifurcation in a Singular Perturbation Problem. . . . .	44
3.4. Bifurcation of Maps. . . . .	50
<b>CHAPTER 4. BIFURCATIONS WITH TWO PARAMETERS IN TWO SPACE DIMENSIONS . . . . .</b>	<b>54</b>
4.1. Introduction . . . . .	54
4.2. Preliminaries. . . . .	57
4.3. Scaling. . . . .	64
4.4. The Case $\epsilon_1 > 0$ . . . . .	64
4.5. The Case $\epsilon_1 < 0$ . . . . .	77
4.6. More Scaling . . . . .	78
4.7. Completion of the Phase Portraits. . . . .	80
4.8. Remarks and Exercises. . . . .	81
4.9. Quadratic Nonlinearities . . . . .	83
<b>CHAPTER 5. APPLICATION TO A PANEL FLUTTER PROBLEM . . .</b>	<b>88</b>
5.1. Introduction . . . . .	88
5.2. Reduction to a Second Order Equation . . . .	89
5.3. Calculation of Linear Terms. . . . .	93
5.4. Calculation of the Nonlinear Terms . . . . .	95

	Page
CHAPTER 6. INFINITE DIMENSIONAL PROBLEMS . . . . .	97
6.1. Introduction . . . . .	97
6.2. Semigroup Theory . . . . .	97
6.3. Centre Manifolds . . . . .	117
6.4. Examples . . . . .	120
REFERENCES . . . . .	136
INDEX . . . . .	141

