

Contents

1	Introduction	1
	References	6
2	Time-Delayed Feedback Control	11
2.1	Control Method	12
2.2	Extended Time-Delayed Feedback	15
2.3	Coupling Schemes	17
2.4	Extensions	22
2.5	Linear Stability Analysis	27
2.6	Transfer Function	29
2.7	Intermediate Conclusion	36
	References	36
3	Control of Steady States	43
3.1	Model Equations	44
3.2	Time-Delayed Feedback	47
3.2.1	Unstable Focus	47
3.2.2	Saddle Point	58
3.3	Extended Time-Delayed Feedback	62
3.4	Latency Effects	68
3.4.1	Time-Delayed Feedback	68
3.4.2	Extended Time-Delayed Feedback	70
3.5	Phase-dependent Coupling	74
3.5.1	Unstable Focus	75
3.5.2	Saddle Point	79
3.5.3	Extended Time-Delayed Feedback	82
3.5.4	Two Feedback Phases	86
3.6	Asymptotic Properties for Large Delays	91
3.7	Intermediate Conclusion	100
	References	101

4	Refuting the Odd Number Limitation Theorem	105
4.1	Review of the Odd Number Limitation Theorem.	106
4.2	Model Equations of the Counterexample	111
4.3	Domains of Control	119
4.4	Rotating Waves and Symmetry	130
4.5	Fold Bifurcation	133
4.6	Intermediate Conclusion	144
	References	145
5	Control of Neutral Delay-Differential Equations	149
5.1	Substructuring or Hybrid Testing.	150
5.2	Model Equations	153
5.3	Asymptotic Properties for Large Delays	160
5.4	Control by Time-Delayed Feedback	165
5.5	Intermediate Conclusion	172
	References	173
6	Neural Systems	175
6.1	Single FitzHugh–Nagumo System	176
6.2	Two Coupled FitzHugh–Nagumo Systems	186
6.3	Single FitzHugh–Nagumo System and Time-Delayed Feedback	197
6.4	Two Coupled FitzHugh–Nagumo Systems and (Extended) Time-Delayed Feedback	208
6.5	Coupling Effects of Time-Delayed Feedback	223
6.6	Towards Networks	232
6.7	Intermediate Conclusion	239
	References	240
7	Summary and Outlook	245
	About the Author	249
	Index	251

<http://www.springer.com/978-3-642-14109-6>

Control of Complex Nonlinear Systems with Delay

Hövel, P.

2010, XVI, 253 p., Hardcover

ISBN: 978-3-642-14109-6