

Alberto Isidori

Nonlinear Control Systems II

With 17 Figures



Springer

Table of Contents

10. Stability of Interconnected Nonlinear Systems	1
10.1 Preliminaries	1
10.2 Asymptotic Stability and Small Perturbations	11
10.3 Asymptotic Stability of Cascade-Connected Systems	14
10.4 Input-to-State Stability	17
10.5 Input-to-State Stability of Cascade-Connected Systems	31
10.6 The “Small-Gain” Theorem for Input-to-State Stable Systems	36
10.7 Dissipative Systems	42
10.8 Stability of Interconnected Dissipative Systems	54
10.9 Dissipative Linear Systems	61
11. Feedback Design for Robust Global Stability	75
11.1 Preliminaries	75
11.2 Stabilization via Partial State Feedback: a Special Case	79
11.3 Stabilization via Output Feedback: a Special Case	90
11.4 Stabilization of Systems in Lower Triangular Form	98
11.5 Design for Multi-Input Systems	109
12. Feedback Design for Robust Semiglobal Stability	125
12.1 Achieving Semiglobal and Practical Stability	125
12.2 Semiglobal Stabilization via Partial State Feedback	135
12.3 A Proof of Theorem 9.6.2	142
12.4 Stabilization of Minimum-Phase Systems in Lower-Triangular Form	149
12.5 Stabilization via Output Feedback Without a Separation Principle	157
12.6 Stabilization via Output Feedback of Non-Minimum-Phase Systems	163
12.7 Examples	172
13. Disturbance Attenuation	183
13.1 Robust Stability via Disturbance Attenuation	183
13.2 The Case of Linear Systems	192
13.3 Disturbance Attenuation	199

13.4	Almost Disturbance Decoupling	201
13.5	An Estimate of the Minimal Level of Disturbance Attenuation	207
13.6	L_2 -gain Design for Linear Systems	212
13.7	Global L_2 -gain Design for a Class of Nonlinear Systems	216
14.	Stabilization Using Small Inputs	227
14.1	Achieving Global Stability via Small Inputs	227
14.2	Stabilization of Systems in Upper Triangular Form	236
14.3	Stabilization Using Saturation Functions	253
14.4	Applications and Extensions	267
	Bibliographical Notes	281
	References	285
	Index	291