

CONTENTS

List of Symbols

Chapter 1: INTRODUCTION	1
1.1 Mathematical Model	1
1.2 Asymptotic Stability	2
1.3 Root Clustering and Parameter Space	3
1.4 Linear Feedback Examples	4
1.5 An Aeroelastic Example	7
1.6 About the Book	8
Chapter 2: REVIEW OF CLASSICAL RESULTS	9
2.1 Table Form	9
2.2 Hermite Form	10
2.3 Hurwitz Form	11
2.4 Inner Form	11
2.5 Lyapunov Form	13
2.6 Some Proofs	14
2.7 Integral Square of Signals	18
2.8 Stability in Parameter Space	22
Chapter 3: INTRODUCTION TO ROOT CLUSTERING	26
3.1 Algebraic Regions	26
3.2 The Structure of Root Clustering Test	28
3.3 Region's Representation	31
3.4 One Variable Transformation I	34
3.5 Eigenvalues of Functions of Matrices	35
3.6 Root Clustering Criteria I	36
3.7 One Variable Transformation II	37
3.8 Root Clustering Criteria II	41
Chapter 4: TRANSFORMABLE REGIONS	45
4.1 P-Transformability	45
4.2 A Test for P-Transformability	50
4.3 R-Transformability	52
4.4 IR-Transformability	58
4.5 Examples	60
Chapter 5: ROOT CLUSTERING CRITERIA	69
5.1 Composite Polynomials	69
5.2 Composite Matrices	76

5.3	Root Clustering Criteria	80
5.4	Some Important Regions	88
Chapter 6 :	SYMMETRIC MATRIX APPROACH	94
6.1	Matrix Equations - A Special Case	95
6.2	Motivation for The General Case	96
6.3	Some Lemmas	98
6.4	Root Clustering Criteria	102
6.5	M-Transformability	104
6.6	Polynomial Root Clustering	107
Chapter 7 :	PARAMETER SPACE AND FEEDBACK DESIGN	118
7.1	Concepts	118
7.2	The Critical Constraints	120
7.3	Admissible Points in the Parameter Space	125
7.4	Compensator Design - Polynomial Form	127
7.5	Compensator Design - Matrix Form	131
7.6	Robust Analysis	136
7.7	Interval Polynomials and Plants	138
	APPENDIX	145
	BIBLIOGRAPHY	147