LIST OF ALGORITHMS

3.3.1	Back Substitution Method for Upper Triangular System	38
3.4.1	The Cholesky Algorithm	51
3.4.2	LU Factorization of an Upper Hessenberg Matrix	52
3.6.1	Givens QR Factorization	62
3.8.1	Least Squares Solution Using QR Factorization	65
3.9.1	Least Squares Solutions Using the SVD	72
4.5.1	Complete QZ Algorithm for Reduction to Generalized Schur Form	99
5.3.1	Padé Approximation to e^A using Scaling and Squaring	132
5.3.2	Schur Algorithm for Matrix Exponential	135
5.3.3	Computing Integrals involving Matrix Exponential	137
5.5.1	Hessenberg Algorithm for the Frequency Response Matrix	144
6.7.1	Staircase Algorithm	174
6.9.1	Newton's Algorithm for Distance to Uncontrollability	186
6.9.2	An Algorithm for Computing $\mu(A, B)$	189
7.2.1	Computing the H_2-Norm	212
7.5.1	Computing Inertia and Stability	219
7.6.1	Bisection Algorithm for Estimating Distance to Continuous-time Instability	225
7.6.2	Bisection Algorithm for Estimating Distance to a Discrete-Unstable System	229
8.3.1	sep Estimation	261
8.5.1	The Hessenberg–Schur Algorithm for $XA + BX = C$	270
8.6.1	Cholesky Factor for Continuous Lyapunov Equation	286
8.6.2	Cholesky Factor for Discrete Lyapunov Equation	290
9.3.1	An SVD Algorithm for Minimal Realization	317
9.3.2	A Modified SVD Algorithm for Minimal Realization	322
9.4.1	A Deterministic Subspace Identification Algorithm	327

9.4.2	A Subspace Stochastic Identification Algorithm	330
9.4.3	Continuous-Time Frequency-Domain Subspace Identification	333
10.5.1	The Algorithm Continuous-Time LQR Design	366
10.6.1	Bisection Algorithm for H_∞-Norm	376
10.6.2	Two-Step Algorithm for H_∞-Norm	379
10.7.1	Bisection Method for Complex Stability Radius	390
11.2.1	The Recursive Algorithm for Singe-Input Hessenberg EVA Problem	411
11.2.2	An RQ Implementation of the Recursive Algorithm	417
11.2.3	A Storage-Efficient Version of the RQ Implementation	418
11.3.1	The Recursive Algorithm for Multi-Input EVA Problem	423
11.3.2	An Algorithm to Assign $p(p = 1$ or $2)$ Eigen values	430
11.3.3	The Schur Algorithm for Multi-Input EVA Problem	431
11.3.4	A Parametric Sylvester Equation Algorithm for PEVA	437
11.6.1	Robust Eigenvalue Assignment Algorithm (The KNV Algorithm)	447
12.3.1	Full-Order Observer Design via Sylvester-Observer Equation	472
12.4.1	Reduced-Order Observer Design via EVA	476
12.4.2	Reduced-Order Observer Design via Sylvester-Observer Equation	479
12.7.1	A Recursive Algorithm for the Multi-Output Sylvester-Observer Equation	488
12.7.2	A Recursive Block Triangular Algorithm for the Multi-Output Sylvester-Observer Equation	492
12.8.1	An Algorithm for Constrained Sylvester-Observer Equation	497
12.9.1	State Estimation using Kalman Filter	501
12.10.1	LQG Design for Continuous time System	507
13.5.1	Schur Algorithm for the CARE	542
13.5.2	Generalized Schur Algorithm for the DARE	553
13.5.3	Inverse-Free Generalized Schur Method for the CARE	556
13.5.4	Inverse-Free Generalized Schur Algorithm for the DARE	558
13.5.5	Computing Sign (A)	560
13.5.6	Matrix Sign-Function Algorithm for the CARE	563
13.5.7	Matrix Sign-Function Algorithm for the DARE	566
13.5.8	Newton's Method for the CARE	568
13.5.9	Newton's Method with Line Search for the CARE	572
13.5.10	Newton's Method for the DARE	574
13.5.11	Newton's Method with Line Search for the DARE	577
14.2.1	Internal Balancing of a Continuous-Time Minimal Realization	604
14.2.2	Square-Root Algorithm for Internal Balancing of a Continuous-Time Nonminimal Realization	607

14.4.1	Model Reduction via Balanced Truncation	614
14.4.2	Schur Algorithm for Continuous-Time Model Reduction	616
14.5.1	Hankel-Norm Approximation of Continuous-Time System	626
15.2.1	Block Arnoldi Algorithm	651
15.2.2	Nonsymmetric Lanczos Algorithm	652
15.4.1	Arnoldi Algorithm for Single-input Lyapunov Equation	653
15.4.2	Block Arnoldi Algorithm for Stable Discrete-Time Lyapunov Equation	654
15.4.3	Restarted Arnoldi Algorithm for Sylvester Equation	655
15.4.4	Block Arnoldi Algorithm for Sylvester Equation	656
15.4.5	Arnoldi Algorithm for Single-Output Sylvester-Observer Equation	657
15.4.6	Arnoldi Algorithm for CARE	658
15.5.1	Projection Algorithm for Partial Pole-Placement	659
15.6.1	Lanczos Algorithm for SISO Model Reduction	660
15.6.2	Arnoldi Algorithm for SISO Model Reduction	661