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Autore	Datta Biswa Nath
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3.7 Orthonormal Bases and Orthogonal Projections Using QR Factorization; 3.8 The Least-Squares Problem; 3.9 The Singular Value Decomposition (SVD); 3.10 Summary and Review; 3.11 Chapter Notes and Further Reading; References; CHAPTER 4. CANONICAL FORMS OBTAINED VIA ORTHOGONAL TRANSFORMATIONS; 4.1 Importance and Significance of Using Orthogonal Transformations; 4.2 Hessenberg Reduction of a Matrix; 4.3 The Real Schur Form of A: The QR Iteration Method; 4.4 Computing the Singular Value Decomposition (SVD); 4.5 The Generalized Real Schur Form: The QZ algorithm; 4.6 Computing of the Eigenvectors of the Pencil  $A - \lambda B$ ; 4.7 Summary and Review; 4.8 Chapter Notes and Further Reading; References; PART II: CONTROL SYSTEMS ANALYSIS; CHAPTER 5. LINEAR STATE-SPACE MODELS AND SOLUTIONS OF THE STATE EQUATIONS; 5.1 Introduction; 5.2 State-Space Representations of Control Systems; 5.3 Solutions of a Continuous-Time System: System Responses; 5.4 State-Space Solution of the Discrete-Time System; 5.5 Transfer Function and Frequency Response; 5.6 Some Selected Software; 5.7 Summary and Review; 5.8 Chapter Notes and Further Reading; Exercises; References; CHAPTER 6. CONTROLLABILITY, OBSERVABILITY, AND DISTANCE TO UNCONTROLLABILITY

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Sommario/riassunto

Numerical Methods for Linear Control Systems Design and Analysis is an interdisciplinary textbook aimed at systematic descriptions and implementations of numerically-viable algorithms based on well-established, efficient and stable modern numerical linear techniques for mathematical problems arising in the design and analysis of linear control systems both for the first- and second-order models. MATLAB-based software is included for implementing all of the major algorithms from the book.\* Unique coverage of modern mathematical concepts such as parallel computations, second-order system

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