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Nota di contenuto	Ordinary Differential Equations -- Homogeneous ODE with Constant Coefficients -- General Solution -- Multiple Roots of [gamma superscript s] -- [alpha] = 0 -- Determination of Coefficients -- Nonhomogeneous ODE with Constant Coefficients -- General Solution -- Particular Solution -- Coupled Ordinary Differential Equations -- Elementary Matrix Algebra -- Vectors and Matrices -- Basic Matrix Operations -- Special Matrices -- Determinants and Matrix Inverse -- Subspaces and Rank -- Quadratic Form of a Matrix -- Matrix Functions -- Solving Linear Algebraic Equations -- Eigenvalues and Eigenvectors -- Diagonalization of a Matrix -- Singular-Value Decomposition -- Basic Equations -- Some Areas of Application -- Homogeneous First-

Order Matrix Differential Equations -- Matrix Exponential -- Nonhomogeneous First-Order Matrix Differential Equations -- Modeling Techniques -- Newton's Three Fundamental Laws -- D'Alembert's Principle -- Principle of Virtual Work -- Hamilton's Principle -- Lagrange's Equations -- Rayleigh's Dissipation Function -- Constraint Equations -- Gibbs--Appell Equations -- Kane's Equations -- Finite-Element Method -- Uniform Beam Element -- Interpolation Functions -- Matrix Equation of Motion for an Element -- Boundary Conditions -- Element Assembly -- Combined Matrix Equations of Motion -- Constraint Equations -- Assembled Matrix Equations of Motion -- Truss Structures -- Truss Element: Longitudinal Motion -- Truss Element: Rigid-Body Motion -- Coordinate Transformation -- Energy Method for Element Assembly.

Sommario/riassunto

The control of vibrating systems is a significant issue in the design of aircraft, spacecraft, bridges and high-rise buildings. This 2001 book discusses the control of vibrating systems, integrating structural dynamics, vibration analysis, modern control and system identification. Integrating these subjects is an important feature in that engineers will need only one book, rather than several texts or courses, to solve vibration control problems. The book begins with a review of basic mathematics needed to understand subsequent material. Chapters then cover more recent and valuable developments in aerospace control and identification theory, including virtual passive control, observer and state-space identification, and data-based controller synthesis. Many practical issues and applications are addressed, with examples showing how various methods are applied to real systems. Some methods show the close integration of system identification and control theory from the state-space perspective, rather than from the traditional input-output model perspective of adaptive control. This text will be useful for advanced undergraduate and beginning graduate students in aerospace, mechanical and civil engineering, as well as for practising engineers.