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DYNAMICS; 5.1 Virtual Displacements; 5.2 Kinematic Constraints and Coordinate Partitioning; 5.3 Virtual Work; 5.4 Examples of Force Elements; 5.5 Workless Constraints; 5.6 Principle of Virtual Work in Statics; 5.7 Principle of Virtual Work in Dynamics; 5.8 Lagrange's Equation; 5.9 Gibbs-Appel Equation; 5.10 Hamiltonian Formulation; 5.11 Relationship between Virtual Work and Gaussian Elimination; Problems; 6 CONSTRAINED DYNAMICS; 6.1 Generalized Inertia 6.2 Mass Matrix and Centrifugal Forces6.3 Equations of Motion; 6.4 System of Rigid Bodies; 6.5 Elimination of the Constraint Forces; 6.6 Lagrange Multipliers; 6.7 Constrained Dynamic Equations; 6.8 Joint Reaction Forces; 6.9 Elimination of Lagrange Multipliers; 6.10 State Space Representation; 6.11 Numerical Integration; 6.12 Differential and Algebraic Equations; 6.13 Inverse Dynamics; 6.14 Static Analysis; Problems; 7 SPATIAL DYNAMICS; 7.1 General Displacement; 7.2 Finite Rotations; 7.3 Euler Angles; 7.4 Velocity and Acceleration; 7.5 Generalized Coordinates; 7.6 Generalized Inertia Forces 7.7 Generalized Applied Forces7.8 Dynamic Equations of Motion; 7.9 Constrained Dynamics; 7.10 Formulation of the Joint Constraints; 7.11 Newton-Euler Equations; 7.12 Linear and Angular Momentum; 7.13 Recursive Methods; Problems; 8 OTHER TOPICS IN SPATIAL DYNAMICS; 8.1 Gyroscopes and Euler Angles; 8.2 Rodriguez Formula; 8.3 Euler Parameters; 8.4 Rodriguez Parameters; 8.5 Quaternions; 8.6 Rigid Body Contact; Problems; REFERENCES; INDEX

Sommario/riassunto

A practical approach to the computational methods used to solve real-world dynamics problems Computational dynamics has grown rapidly in recent years with the advent of high-speed digital computers and the need to develop simulation and analysis computational capabilities for mechanical and aerospace systems that consist of interconnected bodies. Computational Dynamics, Second Edition offers a full introduction to the concepts, definitions, and techniques used in multibody dynamics and presents essential topics concerning kinematics and dynamics of motion in two and th
