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| Soggetti | Vibration<br>Dynamics<br>Computer science - Mathematics<br>Architecture<br>Building<br>Vibration, Dynamical Systems, Control<br>Computational Mathematics and Numerical Analysis<br>Building Construction and Design |
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| Note generali | "First author: to my family." |
| Nota di contenuto | Introductory remarks -- Free vibrations and stability of an elastically connected double-beam system -- Effects of axial compression forces, rotary inertia and shear on forced vibrations of the system of two elastically connected beams -- Static and stochastic stability of an elastically connected beam system on an elastic foundation -- The effects of rotary inertia and transverse shear on the vibration and stability of the elastically connected Timoshenko beam-system on elastic foundation -- The effects of rotary inertia and transverse shear on vibration and stability of the system of elastically connected Reddy-Bickford beams on elastic foundation -- Geometrically non-linear vibration of Timoshenko damaged beams using the new p–version of finite element method. . |

Sommario/riassunto

This book reports on solved problems concerning vibrations and stability of complex beam systems. The complexity of a system is considered from two points of view: the complexity originating from the nature of the structure, in the case of two or more elastically connected beams; and the complexity derived from the dynamic behavior of the system, in the case of a damaged single beam, resulting from the harm done to its simple structure. Furthermore, the book describes the analytical derivation of equations of two or more elastically connected beams, using four different theories (Euler, Rayleigh, Timoshenko and Reddy-Bickford). It also reports on a new, improved p-version of the finite element method for geometrically nonlinear vibrations. The new method provides more accurate approximations of solutions, while also allowing us to analyze geometrically nonlinear vibrations. The book describes the appearance of longitudinal vibrations of damaged clamped-clamped beams as a result of discontinuity (damage). It describes the cases of stability in detail, employing all four theories, and provides the readers with practical examples of stochastic stability. Overall, the book succeeds in collecting in one place theoretical analyses, mathematical modeling and validation approaches based on various methods, thus providing the readers with a comprehensive toolkit for performing vibration analysis on complex beam systems.