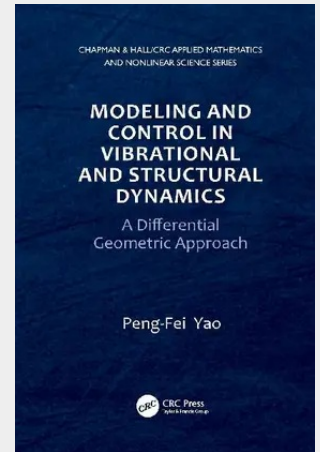


Yao

Modeling and Control in Vibrational and Structural Dynamics

A Differential Geometric Approach

Modeling and Control in Vibrational and Structural Dynamics: A Differential Geometric Approach describes the control behavior of mechanical objects, such as wave equations, plates, and shells. It shows how the differential geometric approach is used when the coefficients of partial differential equations (PDEs) are variable in space (waves/plates), when the PDEs themselves are defined on curved surfaces (shells), and when the systems have quasilinear principal parts. To make the book self-contained, the author starts with the necessary background on Riemannian geometry. He then describes differential geometric energy methods that are generalizations of the classical energy methods of the 1980s. He illustrates how a basic computational technique can enable multiplier schemes for controls and provide mathematical models for shells in the form of free coordinates. The author also examines the quasilinearity of models for nonlinear materials, the dependence of controllability/stabilization on variable coefficients and equilibria, and the use of curvature theory to check assumptions. With numerous examples and exercises throughout, this book presents a complete and up-to-date account of many important advances in the modeling and control of vibrational and structural dynamics.



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