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3.4 Reduction from the Finite Models4 Spectral Element Analysis Method; 4.1 Formulation of Spectral Element Equation; 4.1.1 Computation of Wavenumbers and Wavemodes; 4.1.2 Computation of Spectral Nodal Forces; 4.2 Assembly and the Imposition of Boundary Conditions; 4.3 Eigenvalue Problem and Eigensolutions; 4.4 Dynamic Responses with Null Initial Conditions; 4.4.1 Frequency-Domain and Time-Domain Responses; 4.4.2 Equivalence between Spectral Element Equation and Convolution Integral; 4.5 Dynamic Responses with Arbitrary Initial Conditions
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Appendix 5.A: Finite Element Model of Bernoulli-Euler Beam6 Flow-Induced Vibrations of Pipelines; 6.1 Theory of Pipe Dynamics; 6.1.1 Equations of Motion of the Pipeline; 6.1.2 Fluid-Dynamics Equations; 6.1.3 Governing Equations for Pipe Dynamics; 6.2 Pipelines Conveying Internal Steady Fluid; 6.2.1 Governing Equations; 6.2.2 Spectral Element Modeling; 6.2.3 Finite Element Model; 6.3 Pipelines Conveying Internal Unsteady Fluid; 6.3.1 Governing Equations; 6.3.2 Spectral Element Modeling; 6.3.3 Finite Element Model; Appendix 6.A: Finite Element Matrices: Steady Fluid
Appendix 6.B: Finite Element Matrices: Unsteady Fluid

Sommario/riassunto

Spectral Element Method in Structural Dynamics is a concise and timely introduction to the spectral element method (SEM) as a means of solving problems in structural dynamics, wave propagations, and other related fields. The book consists of three key sections. In the first part, background knowledge is set up for the readers by reviewing previous work in the area and by providing the fundamentals for the spectral analysis of signals. In the second part, the theory of spectral element method is provided, focusing on how to formulate spectral element models and how to conduct spectral el