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2.4.1 Duhamel Integral2.4.2 Numerical Evaluation; 2.4.3 Worked Example - Duhamel Integral; 2.5 References; 3 Systems with Many Degrees of Freedom; 3.1 Introduction; 3.2 Lumped Parameter Systems with Two Degrees of Freedom; 3.3 Lumped Parameter Systems with more than Two Degrees of Freedom; 3.3.1 Free Vibration; 3.3.2 A Worked Example (Two degrees of Freedom System); 3.3.3 Normalization of Mode Shapes; 3.3.4 Orthogonality of Mode Shapes; 3.3.5 Worked Example - Orthogonality Check; 3.4 Mode Superposition; 3.4.1 Use of Normal or Generalized Coordinates; 3.5 Damping Orthogonality
3.6 Non-linear Dynamic Analysis3.6.1 Introduction; 3.6.2 Incremental Integration Process; 3.6.3 Numerical Procedures for Integration; 3.6.4 Estimate of Errors; 3.6.5 Houbolt's Method; 3.6.6 Explicit and Implicit Scheme; 3.6.7 Minimum Time Step t (Explicit Integration Scheme); 3.7 References; 4 Basics of Random Vibrations; 4.1 Introduction; 4.2 Concepts of Probability; 4.2.1 Random Variable Space; 4.2.2 Gaussian or Normal Distribution; 4.2.3 Worked Example with Standard Normal Variable; 4.3 Harmonic Analysis; 4.3.1 Introduction; 4.3.2 Fourier Series (Robson, 1963)
4.3.3 Fourier Integrals (Robson, 1963, with permission)4.3.4 Spectral Density (Robson, 1963); 4.4 Numerical Integration Scheme for Frequency Content; 4.4.1 Introducing Discrete Fourier Transform (DFT); 4.5 A Worked Example (Erzincan, 1992); 4.6 References; 5 Ground Motion Characteristics; 5.1 Characteristics of Ground Motion; 5.1.1 Ground Motion Particulars; 5.1.2 After Shocks and Before Shocks; 5.1.3 Earthquake Source Model; 5.1.4 Empirical Relations of Source Parameters; 5.2 Ground Motion Parameters; 5.2.1 The Nature and Attenuation of Ground Motion
5.2.2 PGA and Modified Mercalli Intensity (MMI)

Sommario/riassunto

This book provides a practical guide to the basic essentials of earthquake engineering with a focus on seismic loading and structural design. Benefiting from the author's extensive career in structural and earthquake engineering, dynamic analysis and lecturing, it is written from an industry perspective at a level suitable for graduate students. Fundamentals of Seismic Loading on Structures is organised into four major sections: introduction to earthquakes and related engineering problems, analysis, seismic loading, and design concepts.From a practical perspective, reviews lin