



Wavelet Analysis in Civil Engineering

Pranesh Chatterjee

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Wavelet Analysis in Civil Engineering Pranesh Chatterjee

Wavelets as a Powerful Signal Processing Tool

The principles of wavelets can be applied to a range of problems in civil engineering structures, such as earthquake-induced vibration analysis, bridge vibrations, and damage identification. This book is particularly useful for graduate students and researchers in vibration analysis, especially those dealing with random vibrations.

Wavelet Analysis in Civil Engineering explains the importance of wavelets in analyzing nonstationarities in ground motions. The example of a tank is considered to develop the problem and the model (based on linear assumptions) and several case studies are explored—fixed base, flexible base, lateral and rocking motions of foundations, with and without fluid—to explain how to account for ground motion nonstationarities. Bridge vibrations caused by vehicle passage are explored, as is structural damage identification. Wavelet analytic techniques starting from single degree of freedom systems to multiple degree of freedom systems are set out and detailed solutions of more complicated problems involving soil and fluid interactions are presented. Separate chapters have been devoted to explaining the basic principles of the wavelet-based random nonstationary vibration analysis of nonlinear systems, including probabilistic analysis.

Comprised of seven chapters, this text:

- Introduces the concept and utility of wavelet transform
- Describes the discretization of ground motions using wavelet coefficients
- Explains how to characterize nonstationary ground motions using statistical functionals of wavelet coefficients of seismic accelerations
- Develops the formulation of a linear single-degree-of-freedom system
- Shows stepwise development of the formulation of a structure idealized as a linear multi-degree-of-

freedom system in terms of wavelet coefficients

- Defines wavelet domain formulation of a nonlinear single-degree-of-freedom system
- Introduces the concept of probability in wavelet-based theoretical formulation of a nonlinear two-degree-of-freedom system
- Covers a variety of case studies highlighting diverse applications

Wavelet Analysis in Civil Engineering explains the importance of wavelets in terms of non-stationarities of ground motions, explores the application of wavelet analytic techniques, and is an excellent resource for users addressing wavelets for the first time.

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The reason why? Because this Wavelet Analysis in Civil Engineering is an unordinary book that the inside of the book waiting for you to snap it but latter it will jolt you with the secret the idea inside. Reading this book beside it was fantastic author who all write the book in such wonderful way makes the content inside of easier to understand, entertaining approach but still convey the meaning entirely. So , it is good for you for not hesitating having this any more or you going to regret it. This amazing book will give you a lot of positive aspects than the other book include such as help improving your proficiency and your critical thinking technique. So , still want to hesitate having that book? If I were you I will go to the guide store hurriedly.

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