



Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations

By Alphose Zingoni

Download now

Read Online →

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni

Appeals to the Student and the Seasoned Professional

While the analysis of a civil-engineering structure typically seeks to quantify static effects (stresses and strains), there are some aspects that require considerations of vibration and dynamic behavior. **Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations** is relevant to instances that involve significant time-varying effects, including impact and sudden movement. It explains the basic theory to undergraduate and graduate students taking courses on vibration and dynamics, and also presents an original approach for the vibration analysis of symmetric systems, for both researchers and practicing engineers. Divided into two parts, it first covers the fundamentals of the vibration of engineering systems, and later addresses how symmetry affects vibration behavior.

Part I treats the modeling of discrete single and multi-degree-of-freedom systems, as well as mathematical formulations for continuous systems, both analytical and numerical. It also features some worked examples and tutorial problems. Part II introduces the mathematical concepts of group theory and symmetry groups, and applies these to the vibration of a diverse range of problems in structural mechanics. It reveals the computational benefits of the group-theoretic approach, and sheds new insights on complex vibration phenomena.

The book consists of 11 chapters with topics that include:

- The vibration of discrete systems or lumped parameter models
- The free and forced response of single degree-of-freedom systems
- The vibration of systems with multiple degrees of freedom

- The vibration of continuous systems (strings, rods and beams)
- The essentials of finite-element vibration modelling
- Symmetry considerations and an outline of group and representation theories
- Applications of group theory to the vibration of linear mechanical systems
- Applications of group theory to the vibration of structural grids and cable nets
- Group-theoretic finite-element and finite-difference formulations

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations acquaints students with the fundamentals of vibration theory, informs experienced structural practitioners on simple and effective techniques for vibration modelling, and provides researchers with new directions for the development of computational vibration procedures.

 [Download Vibration Analysis and Structural Dynamics for Civ ...pdf](#)

 [Read Online Vibration Analysis and Structural Dynamics for C ...pdf](#)

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations

By Alphose Zingoni

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni

Appeals to the Student and the Seasoned Professional

While the analysis of a civil-engineering structure typically seeks to quantify static effects (stresses and strains), there are some aspects that require considerations of vibration and dynamic behavior. **Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations** is relevant to instances that involve significant time-varying effects, including impact and sudden movement. It explains the basic theory to undergraduate and graduate students taking courses on vibration and dynamics, and also presents an original approach for the vibration analysis of symmetric systems, for both researchers and practicing engineers. Divided into two parts, it first covers the fundamentals of the vibration of engineering systems, and later addresses how symmetry affects vibration behavior.

Part I treats the modeling of discrete single and multi-degree-of-freedom systems, as well as mathematical formulations for continuous systems, both analytical and numerical. It also features some worked examples and tutorial problems. Part II introduces the mathematical concepts of group theory and symmetry groups, and applies these to the vibration of a diverse range of problems in structural mechanics. It reveals the computational benefits of the group-theoretic approach, and sheds new insights on complex vibration phenomena.

The book consists of 11 chapters with topics that include:

- The vibration of discrete systems or lumped parameter models
- The free and forced response of single degree-of-freedom systems
- The vibration of systems with multiple degrees of freedom
- The vibration of continuous systems (strings, rods and beams)
- The essentials of finite-element vibration modelling
- Symmetry considerations and an outline of group and representation theories
- Applications of group theory to the vibration of linear mechanical systems
- Applications of group theory to the vibration of structural grids and cable nets
- Group-theoretic finite-element and finite-difference formulations

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations acquaints students with the fundamentals of vibration theory, informs experienced structural practitioners on simple and effective techniques for vibration modelling, and provides researchers with new directions for the development of computational vibration procedures.

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni Bibliography

- Sales Rank: #3078925 in Books
- Published on: 2014-12-03
- Original language: English
- Number of items: 1
- Dimensions: 9.00" h x 6.00" w x .75" l, .84 pounds
- Binding: Paperback
- 276 pages

 [Download Vibration Analysis and Structural Dynamics for Civ ...pdf](#)

 [Read Online Vibration Analysis and Structural Dynamics for C ...pdf](#)

Download and Read Free Online Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni

Editorial Review

Review

"... a valuable addition to the structural dynamics literature. In particular, the final six chapters provide a clear, concise and readable account of the group theoretical basis for simplifying the analysis of symmetric structural dynamical systems. ... the book's author presents an application of some of his own research work on group-theoretical formulations aiming to simplify the modelling of structures with symmetry."
?Computers and Structures, 2015

"... a novel approach to the vibration analysis of symmetric systems. ...the book provides comprehensive guidance for students, practitioners and researchers interested in the essentials and group-theoretic formulations of vibration analysis and structural dynamics."
?ICE Proceedings-Structures-Buildings Journal, 2015

"Strengths of the book are the simplicity and clarity of explaining the basics of structural dynamics, including some worked examples and tutorial questions."
?Guido De Roeck, KU Leuven, Belgium

"This is a fabulous book, written by a true expert in the field. It is rigorous, but accessible, and it helps to simplify some of the most important but complex dynamics phenomena through an innovative link to the mathematics of group theory. This is a book I must have on my book shelf."
?Tim Ibell, President of the Institution of Structural Engineers, Bath, UK

"This book is well written and looks at an important topic in civil engineering education. It progresses from a fundamental treatment at undergraduate level to advanced topics at postgraduate coursework level and postgraduate research studies."
?Mark Bradford, UNSW Australia

About the Author

Alphose Zingoni is professor of structural engineering and mechanics in the Department of Civil Engineering at the University of Cape Town. He holds an M.Sc in structural engineering and a Ph.D in shell structures, both earned at Imperial College London. Dr. Zingoni has research interests encompassing shell structures, space structures, vibration analysis, and applications of group theory to problems in computational structural mechanics. He has written numerous scientific papers on these topics, which have been published in leading international journals and presented at various international conferences worldwide.

Users Review

From reader reviews:

Sally Norman:

Book is written, printed, or descriptive for everything. You can recognize everything you want by a e-book.

Book has a different type. We all know that that book is important matter to bring us around the world. Next to that you can your reading ability was fluently. A publication Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations will make you to end up being smarter. You can feel much more confidence if you can know about everything. But some of you think this open or reading any book make you bored. It is not make you fun. Why they may be thought like that? Have you in search of best book or ideal book with you?

Tyler Emery:

The publication with title Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations includes a lot of information that you can understand it. You can get a lot of help after read this book. This particular book exist new know-how the information that exist in this e-book represented the condition of the world now. That is important to yo7u to know how the improvement of the world. This kind of book will bring you throughout new era of the globalization. You can read the e-book in your smart phone, so you can read it anywhere you want.

Rhonda Rudder:

On this era which is the greater man or woman or who has ability in doing something more are more treasured than other. Do you want to become certainly one of it? It is just simple strategy to have that. What you have to do is just spending your time not much but quite enough to possess a look at some books. On the list of books in the top collection in your reading list is actually Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations. This book and that is qualified as The Hungry Hills can get you closer in becoming precious person. By looking upward and review this book you can get many advantages.

Matthew Gregg:

As we know that book is significant thing to add our know-how for everything. By a reserve we can know everything you want. A book is a list of written, printed, illustrated or maybe blank sheet. Every year seemed to be exactly added. This publication Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations was filled regarding science. Spend your extra time to add your knowledge about your scientific disciplines competence. Some people has several feel when they reading the book. If you know how big benefit of a book, you can experience enjoy to read a e-book. In the modern era like now, many ways to get book that you just wanted.

Download and Read Online Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni #7JEUGQ6S09T

Read Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni for online ebook

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni books to read online.

Online Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni ebook PDF download

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni Doc

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni Mobipocket

Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni EPub

7JEUGQ6S09T: Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations By Alphose Zingoni