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Swift analysis of civil engineering structures using graph theory methods. (English)
Zbl 07211631

Preliminary review / Publisher’s description: This book proposes and validates a number of methods and shortcuts for frugal engineers, which will allow them to significantly reduce the computational costs for analysis and reanalysis and, as a result, for structural design processes. The need for accuracy and speed in analyzing structural systems with ever-tighter design tolerances and larger numbers of elements has been relentlessly driving forward research into methods that are capable of analyzing structures at a reasonable computational cost.

The methods presented are of particular value in situations where the analysis needs to be repeated hundreds or even thousands of times, as is the case with the optimal design of structures using different metaheuristic algorithms.

Featuring methods that are not only applicable to skeletal structures, but by extension also to continuum models, this book will appeal to researchers and engineers involved in the computer-aided analysis and design of structures, and to software developers in this field. It also serves as a complement to previous books on the optimal analysis of large-scale structures utilizing concepts of symmetry and regularity. Further, its novel application of graph-theoretical methods is of interest to mathematicians.

MSC:
74-XX Mechanics of deformable solids
05-XX Combinatorics
15-XX Linear and multilinear algebra; matrix theory

Full Text: DOI