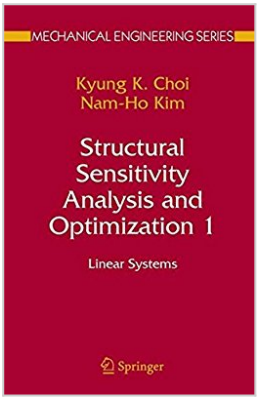

Structural Sensitivity Analysis and Optimization 1: Linear Systems (Mechanical Engineering Series)

By Kyung K. Choi, Nam-Ho Kim

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Extensive numerical methods for computing design sensitivity are included in the text for practical application and software development. The numerical method allows integration of CAD-FEA-DSA software tools, so that design optimization can be carried out using CAD geometric models instead of FEA models. This capability allows integration of CAD-CAE-CAM so that optimized designs can be manufactured effectively.

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- Rank: #2402519 in Books
- Published on: 2004-12-08
- Original language: English
- Number of items: 1
- Dimensions: 9.21" h x 1.00" w x 6.14" l, 1.65 pounds
- Binding: Hardcover
- 448 pages

Editorial Review

Review

From the reviews:

"This recent book … deals with all aspects of sensitivity analysis for structural systems. … One highlight is the elaboration on the differences in working with the reduced stiffness matrix and with the generalized stiffness matrix. … There are many other details that readers will appreciate when using the book … . The book is a welcome, up-to-date addition to the literature in the area and it is a must as a reference volume for any research group working in sensitivity analysis and design optimization." (Martin P. Bendsøe, Structural Multidisciplinary Optimization, Vol. 32, 2006)

From the Back Cover

Structural design sensitivity analysis concerns the relationship between design variables available to the design engineer and structural responses determined by the laws of mechanics. The dependence of response measures such as displacement, stress, strain, natural frequency, buckling load, acoustic response, frequency response, noise-vibration-harshness (NVH), thermo-elastic response, and fatigue life on the material property, sizing, component shape, and configuration design variables is defined through the energy principles (governing equations) of structural mechanics. In this 2-volume set, first- and second- order design sensitivity analyses are presented for static and dynamics responses of both linear and nonlinear elastic structural systems, including elasto-plastic and frictional contact problems.

Book I *Linear Systems* introduces structural design concepts that include the CAD-based design model, design parameterization, performance measures, costs, and constraints. It also discusses design sensitivity analysis of linear structural systems, and discrete and continuum design sensitivity analysis methods.

About the Authors:

K.K. Choi is a Carver Professor of Mechanical Engineering at The University of Iowa. He teaches in the Mechanical and Industrial Engineering Department, and is a researcher in the Center for Computer Aided Design. His research area is in mechanical system analysis, design sensitivity analysis, and reliability based design optimization. He has authored numerous publications and has twice won the ASME Best Paper Award. He is an associate editor for four national and international journals, a fellow of ASME, and associate fellow of AIAA.

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Both authors are members of several professional societies including the American Society of Mechanical

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