



Principles of Optimal Design: Modeling and Computation

By Panos Y. Papalambros, Douglas J. Wilde

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This text discusses modelling for design optimization. It presents a condensed version of classical optimization theory and numerical algorithms, which it integrates with the newer ideas of monotonicity analysis and model boundedness. Careful definition of new concepts and rigorous proof of simple but important principles are followed by immediate applications. It begins with the definition of modelling and the optimization problem and outlines the limitations of this approach. The authors then move on to discuss the important but rarely emphasized concepts of boundedness checking, the idea that the parameters of every model should be verified and simplified; and monotonicity analysis, a method of determining which variables actively constrain a model. Then the discussion turns to the classical theory of differential optimization and hence to powerful numerical optimization techniques. Extensive examples and exercises aid the student and provide practice. A knowledge of differential calculus is helpful.

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Bibliography

- Rank: #4364023 in Books
- Published on: 1991-09-27
- Ingredients: Example Ingredients
- Original language: English
- Number of items: 1
- Dimensions: 9.96" h x .94" w x 6.97" l,
- Binding: Paperback
- 438 pages

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