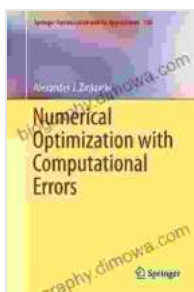


# Numerical Optimization with Computational Errors: A Comprehensive Guide for Practitioners and Scholars

Numerical optimization is a fundamental tool in many scientific and engineering applications. It involves finding the optimal solution to a mathematical problem that typically involves minimizing or maximizing a given objective function. However, in practical applications, computational errors are unavoidable due to finite-precision arithmetic, rounding, and other sources of uncertainty.

The book "Numerical Optimization with Computational Errors" by Springer Optimization and Its Applications provides a comprehensive guide to addressing computational errors in numerical optimization. It offers a systematic treatment of the subject, combining theoretical foundations with practical insights and applications.



## Numerical Optimization with Computational Errors (Springer Optimization and Its Applications Book 108)

by Alexander J. Zaslavski

★★★★☆ 4.7 out of 5

Language : English

File size : 79092 KB

Text-to-Speech : Enabled

Enhanced typesetting : Enabled

Print length : 877 pages



## **Key Concepts and Methods**

The book begins by introducing the basic concepts of numerical optimization, including optimization problems, objective functions, and optimization algorithms. It then delves into the types and sources of computational errors that can arise in optimization calculations.

The key methods for handling computational errors are presented in detail, including:

- \* Error analysis: Techniques for estimating and bounding the errors introduced by different sources.
- \* Error control: Strategies for mitigating errors and ensuring reliable optimization results.
- \* Uncertainty quantification: Methods for incorporating uncertainty into optimization models and accounting for its impact on the solution.

## **Applications**

The book covers a wide range of applications where computational errors are particularly relevant, such as:

- \* Large-scale optimization problems where errors can accumulate over numerous iterations.
- \* Optimization under uncertainty where input data or model parameters are uncertain.
- \* Real-time optimization where time constraints limit the accuracy of computations.
- \* Machine learning and data analysis where errors can propagate through complex models.

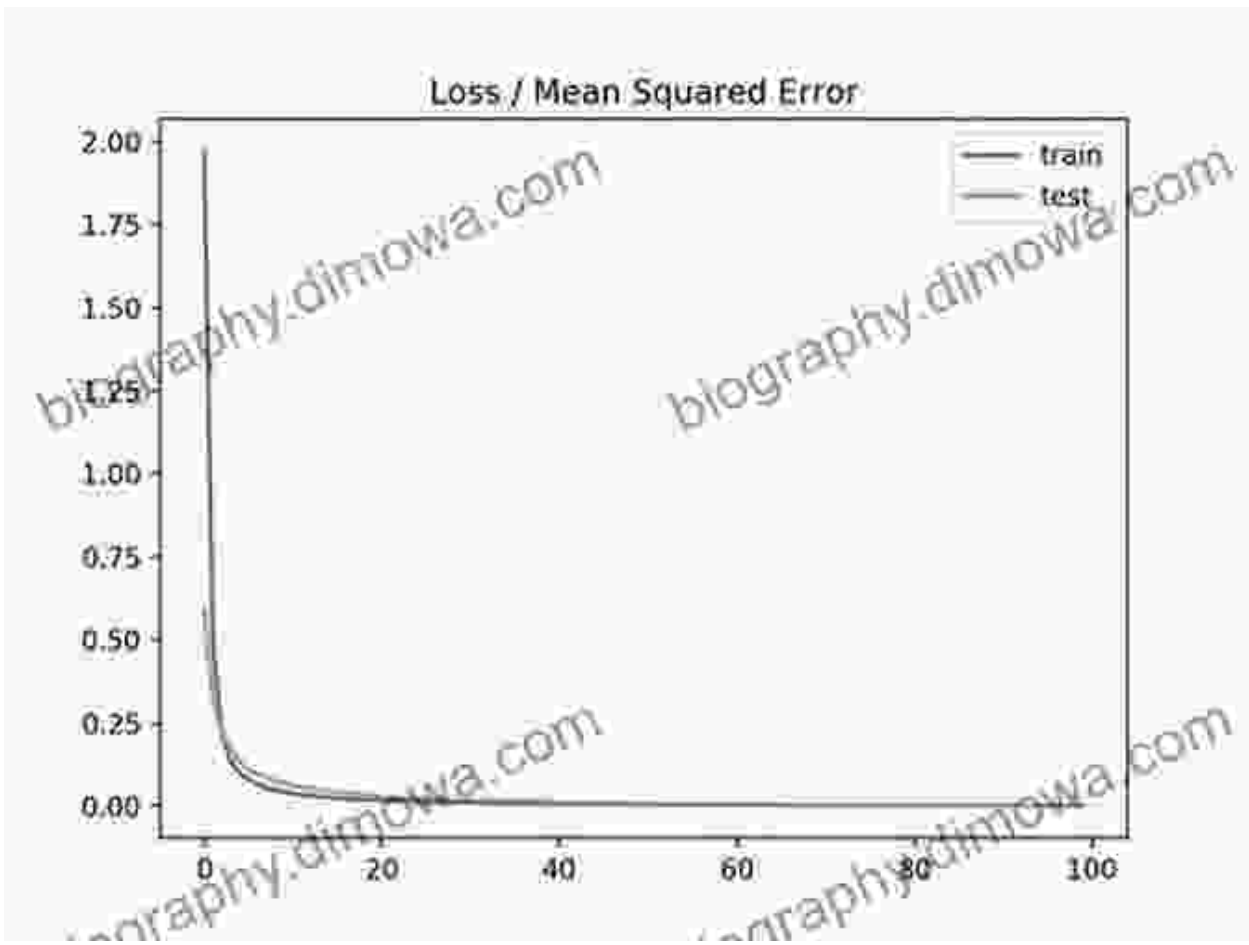
## **Relevance for Practitioners and Scholars**

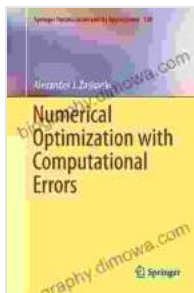
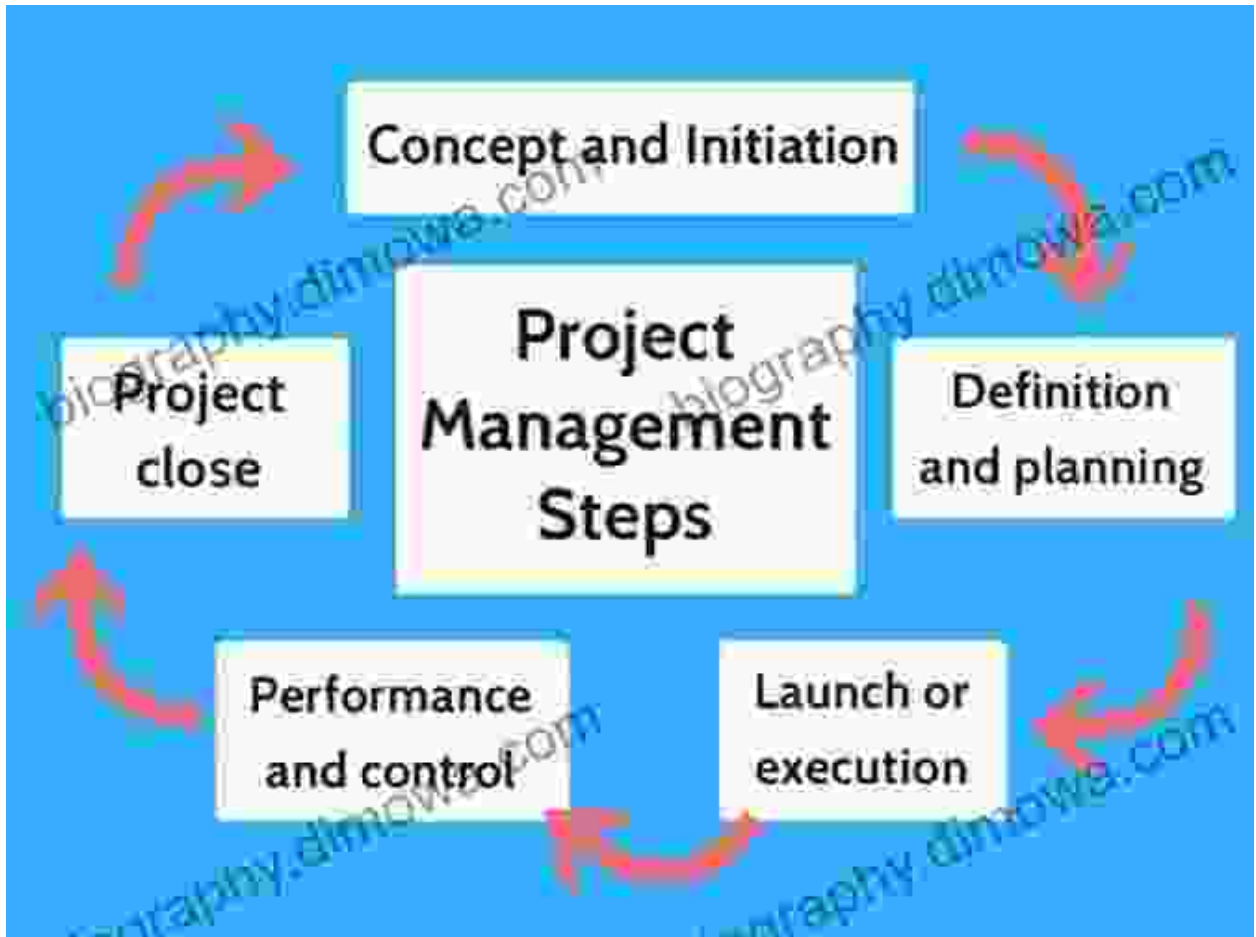
"Numerical Optimization with Computational Errors" is an invaluable resource for both practitioners and scholars in various fields.

\* **Practitioners** will benefit from the practical guidance on how to handle computational errors in their optimization projects. The book provides clear instructions and step-by-step examples that can be directly implemented in real-world applications. \* **Scholars** will find a comprehensive theoretical framework for understanding and analyzing computational errors in optimization. The book explores advanced topics, such as error propagation, sensitivity analysis, and robust optimization, which are essential for researchers in this field.

"Numerical Optimization with Computational Errors" by Springer Optimization and Its Applications is a comprehensive and authoritative guide to addressing computational errors in optimization. It provides a solid theoretical foundation, practical methods, and real-world applications that make it an indispensable resource for practitioners and scholars alike. Whether you are working on large-scale problems, optimizing under uncertainty, or simply seeking to improve the accuracy and reliability of your optimization results, this book is an essential tool in your arsenal.

**Image Alt Attributes:**





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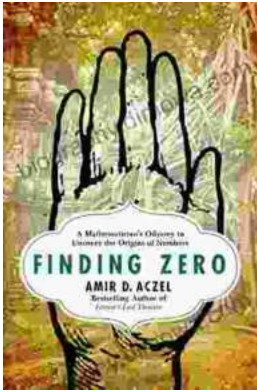
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