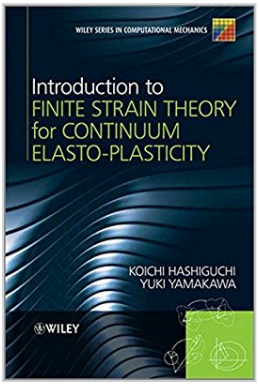

Introduction to Finite Strain Theory for Continuum Elasto-Plasticity

By Koichi Hashiguchi, Yuki Yamakawa

Introduction to Finite Strain Theory for Continuum Elasto-Plasticity By Koichi Hashiguchi, Yuki Yamakawa

Comprehensive introduction to finite elastoplasticity, addressing various analytical and numerical analyses & including state-of-the-art theories

Introduction to Finite Elastoplasticity presents introductory explanations that can be readily understood by readers with only a basic knowledge of elastoplasticity, showing physical backgrounds of concepts in detail and derivation processes of almost all equations. The authors address various analytical and numerical finite strain analyses, including new theories developed in recent years, and explain fundamentals including the push-forward and pull-back operations and the Lie derivatives of tensors.

As a foundation to finite strain theory, the authors begin by addressing the advanced mathematical and physical properties of continuum mechanics. They progress to explain a finite elastoplastic constitutive model, discuss numerical issues on stress computation, implement the numerical algorithms for stress computation into large-deformation finite element analysis and illustrate several numerical examples of boundary-value problems. Programs for the stress computation of finite elastoplastic models explained in this book are included in an appendix, and the code can be downloaded from an accompanying website.

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Editorial Review

From the Back Cover

Elasto-plastic deformation is frequently observed in machines and structures, hence its prediction is an important consideration at the design stage. Elasto-plasticity theories will be increasingly required in the future in response to the development of new and improved industrial technologies. Although various books for elasto-plasticity have been published to date, they focus on infinitesimal elasto-plastic deformation theory. However, modern computational techniques employ an advanced approach to solve problems in this field and much research has taken place in recent years into finite strain elasto-plasticity. This book describes this approach and aims to improve mechanical design techniques in mechanical, civil, structural and aeronautical engineering through the accurate analysis of finite elasto-plastic deformation.

Introduction to Finite Strain Theory for Continuum Elasto-Plasticity presents introductory explanations that can be easily understood by readers with only a basic knowledge of elasto-plasticity, showing physical backgrounds of concepts in detail and derivation processes of almost all equations. The authors address various analytical and numerical finite strain analyses, including new theories developed in recent years, and explain fundamentals including the push-forward and pull-back operations and the Lie derivatives of tensors.

Key features:

- Comprehensively explains finite strain continuum mechanics and explains the finite elasto-plastic constitutive equations
- Discusses numerical issues on stress computation, implementing the numerical algorithms into large-deformation finite element analysis
- Includes numerical examples of boundary-value problems
- Accompanied by a website (www.wiley.com/go/hashiguchi) hosting computer programs for the return-mapping and the consistent tangent moduli of finite elasto-plastic constitutive equations

Introduction to Finite Strain Theory for Continuum Elasto-Plasticity is an ideal reference for research engineers and scientists working with computational solid mechanics and is a suitable graduate text for computational mechanics courses.

Users Review

From reader reviews:

Deanna Ratliff:

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