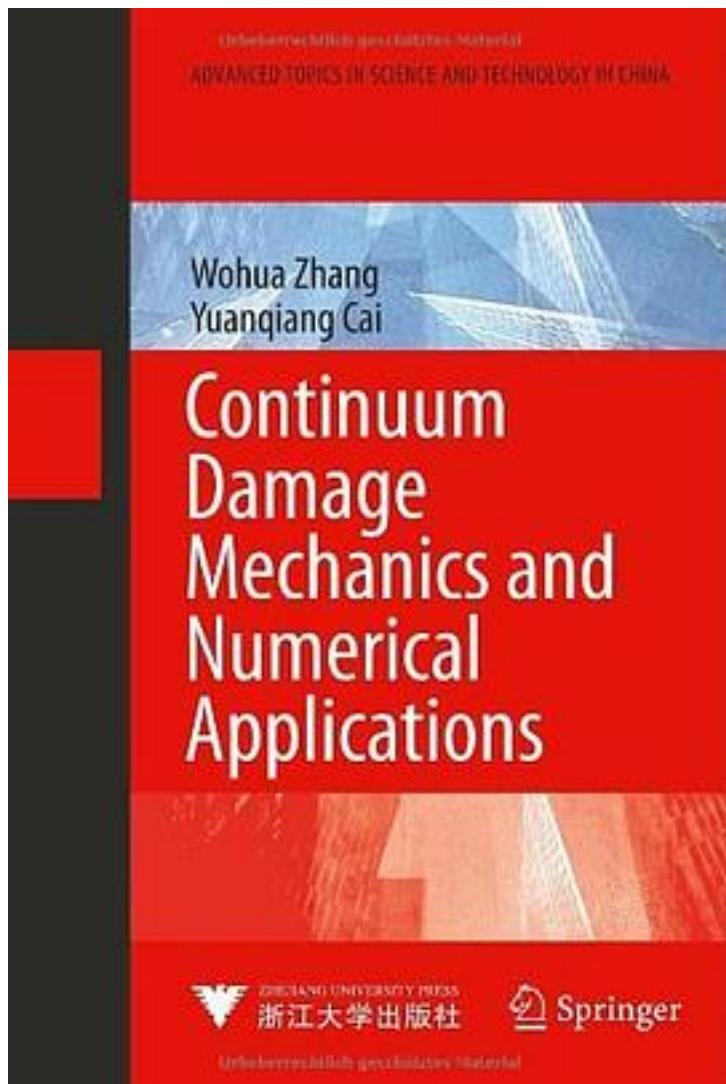


Continuum Damage Mechanics and Numerical Applications



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出版者:Springer

出版时间:2011-1-14

装帧:Hardcover

isbn:9783642047077

This book presents a systematic development of the theory of Continuum Damage Mechanics and its numerical engineering applications with a unified form of mathematical formulations in anisotropic and isotropic damage models. The areas studied in this book are (1) Review of damage mechanics; (2) Basis of isotropic damage mechanics; (3) Brittle damage mechanics of rock mass; (4) Theory of isotropic elasto-plastic damage mechanics; (5) Basis of anisotropic damage mechanics; (6) Theory of anisotropic elasto-plastic damage mechanics; (7) Theory of elasto-visco-plastic damage mechanics; (8) Dynamics of damage problems; (9) Fatigue damage of dynamic structures; (10) Micro-damage mechanics; (11) Random damage mechanics; (12) Numerical method in continuum damage mechanics; (13) Application of damage mechanics to problems coupled with multiphase medium. The theoretical framework of continuum damage mechanics presented in this book is based on the thermodynamic theory of energy and material dissipation, and is described by employing a group of internal state variables as a set of fundamental formulations of constitutive equations of damaged materials, development equations of the damaged state, and evolution equations of micro-structures. According to concepts of damage-dissipation of the material state and effective evolution of material properties, all these advanced equations, which take damage aspects into account, are developed and modified from the traditional general failure models, because they are more easily applied and verified in a very wide range of engineering practices by experimental tests, either macroscopically or microscopically. The most practical applications of the theory developed in this book are presented in different engineering topics analyzed by a specified numerical method. Some essential programs of the continuum damage mechanics are listed in the appendices.

作者介绍:

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