MATERIAL INSTABILITIES IN ELASTIC AND PLASTIC SOLIDS

EDITED BY

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Material Instabilities In Solids

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Material Instabilities In Solids:

Phase Transformations and Material Instabilities in Solids Morton Gurtin,2012-12-02 Phase Transformations and Material Instabilities in Solids contains the proceedings of an interdisciplinary conference on phase transitions and material instabilities in solids conducted by the Mathematics Research Center of the University of Wisconsin Madison on October 11 13 1983 in Madison Wisconsin The papers explore phase transformations and material instabilities in solids and cover topics ranging from equilibrium shapes of surfaces to morphological instabilities and dendrite formation Shock induced phase transitions are also considered Comprised of 11 chapters this book begins with a discussion on material instabilities and the calculus of variations followed by an analysis of mechanical analogs of coexistent phases A model for the formation of shear bands in simple shear that involves the description of irreversible mechanical shear and the resulting heat release is then presented Subsequent chapters focus on the Cauchy and Born hypotheses for crystals the arrangement of coherent phases in a loaded body one dimensional shock layers in Korteweg fluids and dynamics of first order phase transitions The final chapter deals with equilibrium shapes of surfaces and grain boundaries This monograph will be of interest to students practitioners and researchers in mathematics and statistical physics *Material Instabilities in Solids* René de Borst,Erik van der Giessen,1998-10-15 This text is an edited collection of 40 scientists contributions from the International Union of Theoretical and Applied Mechanics IUTAM Symposium on Material Instabilities in Solids which was held in Delft in June 1997

Material Instabilities in Elastic and Plastic Solids Henryk Petryk,2014-05-04 This book collects recent theoretical developments in the area of material instability in elastic and plastic solids along with related analytical and numerical methods and applications The existing different approaches to instability phenomena in metal single crystals polycristals and in geomaterials are presented with the emphasis laid on mutual relations and on unifying concepts including elliptictly loss and the energy criterion Quasi static bifurcation initiation of single or multiple shear bands and post critical strain localization are examined along with dynamic phenomena as wave propagation moving shocks internal snap through and instability of flutter type This gives an overview of a variety of material instability problems methods and applications

Phase Transformations and material instabilities in solids ,1984   **Phase Transformations and Material Instabilities in Solids** Morton E. Gurtin,1984   **Material instabilities in rate and temperature dependent solids** Igor Dobovšek,1992   Nonlinear Solid Mechanics Adnan Ibrahimbegovic,2009-06-02 This book offers a recipe for constructing the numerical models for representing the complex nonlinear behavior of structures and their components represented as deformable solid bodies Its appeal extends to those interested in linear problems of mechanics   IUTAM Symposium on Computational Mechanics of Solid Materials at Large Strains Christian Miehe,2013-06-29 The steady increase in computational power induces an equally steady increase in the complexity of the engineering models and associated computer codes This particularly affects the modeling of the mechanical response of materials Material behavior is nowadays

modeled in the strongly nonlinear range by tak ing into account finite strains complex hysteresis effects fracture phenomena and multiscale features Progress in this field is of fundamental importance for many engineering disciplines especially those concerned with material testing safety reliability and serviceability analyses of engineering structures In recent years many important achievements have been made in the field of the theoretical formulation the mathematical analysis and the numerical im plementation of deformation processes in solids Computational methods and simulation techniques today play a central role in advancing the understanding of complex material behavior Research in the field of ComputationalMechan ics of Materials is concerned with the development of mathematical models and numerical solution techniques for the simulation of material response It is a very broad interdisciplinary field of science with inputs from traditional fields such as Applied Mechanics Applied Mathematics Materials Science Solid State Physics and Information Technology The intention of the IUTAM Symposium Computational Mechanics of Solid Materials at Large Strains held at the University of Stuttgart Germany from August 20 24 200I was to give a state of the art and a survey about recent developments in this field and to create perspectives for future research trends **Constitutive Modelling of Solid Continua** José Merodio,Raymond W. Ogden,2025-10-26 This second edition offers a comprehensive collection of state of the art chapters on continuum mechanics covering topics such as the constitutive theory of magnetoelastic solids solids with evolving reference configurations second gradient solids and biological tissues Featuring both updated original chapters and new contributions from leading experts it provides a rigorous theoretical treatment of constitutive laws for modeling the mechanical and coupled field behavior of solid materials The book explores a broad spectrum of material behavior including isotropic and anisotropic nonlinear elasticity implicit theories viscoelasticity plasticity electro and magneto mechanical interactions growth damage thermomechanics poroelasticity composites and homogenization By presenting a unified theoretical framework it serves as a valuable resource for researchers studying the deformation of solid materials across various applications and is an essential reference for graduate students senior academics and industry professionals alike **Mathematical Methods And Models In Composites (Second Edition)** Vladislav Mantic,2023-03-10 Mathematical Methods and Models in Composites Second Edition provides an in depth treatment of modern and rigorous mathematical methods and models applied to composites modeling on the micro meso and macro scale There has been a steady growth in the diversity of such methods and models that are used in the analysis and characterization of composites their behavior and their associated phenomena and processes This second edition expands upon the success of the first edition and has been substantially revised and updated Written by well known experts in different areas of applied mathematics physics and composite engineering this book is mainly focused on continuous fiber reinforced composites and their ever increasing range of applications for example in the aerospace industry though it also covers other kind of composites The chapters cover a range of topics including but not limited to scaling and homogenization procedures in composites thin plate and wave solutions in anisotropic materials

laminated structures fiber reinforced nonlinearly elastic solids buckling and postbuckling fracture and damage analysis of composites and highly efficient methods for simulation of composites manufacturing such as resin transfer molding The results presented are useful for the design fabrication testing and industrial applications of composite components and structures This book is an essential reference for graduate and doctoral students as well as researchers in mathematics physics and composite engineering Explanations and references in the book are sufficiently detailed so as to provide the necessary background to further investigate the fascinating subject of composites modeling and explore relevant research literature It is also suitable for non experts who wish to have an overview of the mathematical methods and models used for composites and of the open problems in this area that require further research *Mathematics and Mechanics of Granular Materials* James M. Hill,A.P.S. Selvadurai,2005-12-27 Granular or particulate materials arise in almost every aspect of our lives including many familiar materials such as tea coffee sugar sand cement and powders At some stage almost every industrial process involves a particulate material and it is usually the cause of the disruption to the smooth running of the process In the natural environment understanding the behaviour of particulate materials is vital in many geophysical processes such as earthquakes landslides and avalanches This book is a collection of current research from some of the major contributors in the topic of modelling the behaviour of granular materials Papers from every area of current activity are included such as theoretical numerical engineering and computational approaches This book illustrates the numerous diverse approaches to one of the outstanding problems of modern continuum mechanics **Journal of the Mechanical Behavior of Materials** ,2003 **Material Instabilities in Continuum Mechanics** John MacLeod Ball,1988 The proceedings of a Symposium Year on Material instabilities in continuum mechanics organized by the Department of Mathematics Heriot Watt University Edinburgh 1985 1986 Nonequilibrium Materials J. Lendvai,1995-05-10 Proceedings of the E tv s Graduate School of Physics International Summer Course 1994 on Nonequilibrium Materials held in E tv s Budapest Hungary August 1994 *ECCOMAS '96, Computational Methods in Applied Sciences '96* J. A. D?sid?ri,Charles Hirsch,P. Le Tallec,E. O?ate,Maurizio Pandolfi,Jacques P?riaux,Erwin Stein,1996-10-08 The European Community on Computational Methods in Applied Science ECCOMAS has been created with the aim of providing a co ordination of international scientific conferences and other activities in the field of computational methods in applied sciences The main objective of the joint conferences on computational fluid dynamics and numerical methods in engineering is to provide a common forum for the presentation and discussion of scientific computing applied to engineering sciences Equal emphasis is to be given to basic methodologies scientific developments and industrial applications These conferences are presented in three volumes Volume one Computational Fluid Dynamics 96 covers the proceedings of the Third ECCOMAS Conference on Computational Fluid Dynamics Volume two Numerical Methods in Engineering 96 covers the proceedings of the second ECCOMAS Conference on Numerical Methods in Engineering and Volume three Computational Methods in Applied Sciences

96 which presents invited lectures and special technical sessions of both the Third ECCOMAS Computational Fluid Dynamics Conference and the Second ECCOMAS Conference on Numerical Methods in Engineering 5th European Mechanics of Materials Conference on Scale Transitions from Atomistics to Continuum Plasticity E. van der Giessen,S. Forest,L. Kubin,2001 Partial Differential Equations and Related Subjects Mario Miranda,1992 *Euromat 99, Materials for Buildings and Structures* F. H. Wittmann,2000 Building materials are experiencing degradation phenomena due to the long term action of the atmospheric components The understanding of the transport characteristics in concrete is a key issue to mitigate the deleterious consequences Conventional cement based materials suffer from a lack of ductility However modern cement compositions fiber materials and additions allow to engineer new products adjusted to the purpose These and several key topics for modern civil engineering are discussed in this book **Fourth International Conference on Constitutive Laws for Engineering Materials** R. C. Picu,Erhard Krempl,1999 *Adaptive Material Systems* Greg P. Carman,Chris Lynch,Nancy R. Sottos,1995

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