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Theory of Elasticity and Plasticity Valentin Molotnikov 2021 This book serves as a core text for university curricula in solid body mechanics and, at the same time, examines the main achievements of state of the art research in the mechanics of elastic and non-elastic materials. This latter goal of the book is achieved through rich bibliographic references, many from the authors' own work. authors. Distinct from similar texts, there are no claims in this volume to a single universal theory of plasticity. However, solutions are given to some new problems and to the construction of models useful both in pedagogic terms for students and practical terms for professional design engineers. Examples include the authors' decisions about the Brazilian test, stability of rock exposure, and pile foundations. Designed for both upper-level university students and specialists in the mechanics of deformable hard body, the material in this book serves as a source for numerous topics of course

and diploma concentration.
Encyclopaedia of Mathematics M. Hazewinkel 2013-12-01
Mathematical Problems in Plasticity Roger Temam 2018-12-18 This study of the problem of the equilibrium of a perfectly plastic body under specific conditions employs tools and methods that can be applied to other areas, including the mechanics of fracture and certain optimal control problems. The three-part approach begins with an exploration of variational problems in plasticity theory, covering function spaces, concepts and results of convex analysis, formulation and duality of variational problems, limit analysis, and relaxation of the boundary condition. The second part examines the solution of variational problems in the finite-energy spaces; its topics include relaxation of the strain problem, duality between the generalized stresses and strains, and the existence of solutions to the generalized strain problem. The third and final part addresses asymptotic problems and problems in the theory of plates. The text includes a substantial bibliography and a new Preface and appendix by the author.
Plasticity Weimin Han 2012-11-16 This book focuses on the theoretical aspects of small strain theory of elastoplasticity with hardening assumptions. It provides a comprehensive and unified treatment of the mathematical theory and numerical analysis. It is divided into three parts, with the first part providing a detailed introduction to plasticity, the second part covering the mathematical analysis of the elasticity problem, and the third part devoted to error analysis of various semi-discrete and fully discrete approximations for variational formulations of the elastoplasticity. This revised and expanded edition includes material on single-crystal and strain-gradient plasticity. In addition, the entire book has been revised to make it more accessible to readers who are actively involved in computations but less so in numerical analysis. Reviews of earlier edition: “The authors have written an excellent book which can be recommended for specialists in plasticity who wish to know more about the mathematical theory, as well as those with a background in the mathematical sciences who seek a self-contained account of the mechanics and mathematics of plasticity theory.” (ZAMM, 2002) “In summary, the book represents an impressive comprehensive overview of the mathematical approach to the theory and numerics of plasticity. Scientists as well as lecturers and graduate students will find the book very useful as a reference for research or for preparing courses in this field.” (Technische Mechanik) "The book is professionally written and

will be a useful reference to researchers and students interested in mathematical and numerical problems of plasticity. It represents a major contribution in the area of continuum mechanics and numerical analysis." (Math Reviews)

Plasticity Theory Jacob Lubliner 2013-04-22 The aim of Plasticity Theory is to provide a comprehensive introduction to the contemporary state of knowledge in basic plasticity theory and to its applications. It treats several areas not commonly found between the covers of a single book: the physics of plasticity, constitutive theory, dynamic plasticity, large-deformation plasticity, and numerical methods, in addition to a representative survey of problems treated by classical methods, such as elastic-plastic problems, plane plastic flow, and limit analysis; the problem discussed come from areas of interest to mechanical, structural, and geotechnical engineers, metallurgists and others. The necessary mathematics and basic mechanics and thermodynamics are covered in an introductory chapter, making the book a self-contained text suitable for advanced undergraduates and graduate students, as well as a reference for practitioners of solid mechanics.

Encyclopaedia of Mathematics Michiel Hazewinkel 2012-12-06 This ENCYCLOPAEDIA OF MA THEMA TICS aims to be a reference work for all parts of mathe matics. It is a translation with updates and editorial comments of the Soviet Mathematical Encyclopaedia published by 'Soviet Encyclopaedia Publishing House' in five volumes in 1977-1985. The annotated translation consists of ten volumes including a special index volume. There are three kinds of articles in this ENCYCLOPAEDIA. First of all there are survey-type articles dealing with the various main directions in mathematics (where a rather fine subdivi sion has been used). The main requirement for these articles has been that they should give a reasonably complete up-to-date account of the current state of affairs in these areas and that they should be maximally accessible. On the whole, these articles should be understandable to mathematics students in their first specialization years, to graduates from other mathematical areas and, depending on the specific subject, to specialists in other domains of science, en gineers and teachers of mathematics. These articles treat their material at a fairly general level and aim to give an idea of the kind of problems, techniques and concepts involved in the area in question. They also contain background and motivation rather than precise statements of precise theorems with detailed definitions and technical details on how to carry out proofs and constructions. The second kind of article, of medium length, contains more detailed

concrete problems, results and techniques.
Variational Methods for Problems from Plasticity Theory and for Generalized Newtonian Fluids Martin Fuchs 2007-05-06 Variational methods are applied to prove the existence of weak solutions for boundary value problems from the deformation theory of plasticity as well as for the slow, steady state flow of generalized Newtonian fluids including the Bingham and Prandtl-Eyring model. For perfect plasticity the role of the stress tensor is emphasized by studying the dual variational problem in appropriate function spaces. The main results describe the analytic properties of weak solutions, e.g. differentiability of velocity fields and continuity of stresses. The monograph addresses researchers and graduate students interested in applications of variational and PDE methods in the mechanics of solids and fluids.
Plasticity and Textures W. Gambin 2001-12-31 This book unifies, for the first time in book form, the main concepts of the physical and mathematical theory of plasticity. It presents the foundations of modern anisotropic plasticity, which link microscopic observations of texture formation with macroscopic properties of plastically anisotropic materials. Progress in metal-forming technologies has created the necessity to express the plastic yield process in terms of mathematics in order to apply computer methods. In addition new materials used in structural elements require a more detailed description of their physical structure. Amongst both metallurgists and mechanical designers, a strong tendency exists to formulate the scientific material in a common language. This book meets this request, although it has no ambitions to summarise the existing state of knowledge, only to combine the mathematical and physical approaches. The book is mainly addressed to mechanical designers. It is written for researchers who have a knowledge of physics and who want a mathematical tool for using this knowledge for a better description of technological processes. Moreover, it will interest metallurgists who want to have a more general view of their field of research, as well as for mechanical and civil engineers who want to apply some microstructural knowledge in their work. It could also be useful for graduate students at post-doctorate level who want to enter the field of plastic deformation of polycrystalline metals with texture.
Continuum Theory of Plasticity Akhtar S. Khan 1995-02-28 The only modern, up-to-date introduction to plasticity Despite phenomenal progress in plasticity research over the past fifty years, introductory books on plasticity have changed very little. To meet the need for an up-to-date introduction to the field, Akhtar S. Khan and Sujian

Huang have written Continuum Theory of Plasticity--a truly modern text which offers a continuum mechanics approach as well as a lucid presentation of the essential classical contributions. The early chapters give the reader a review of elementary concepts of plasticity, the necessary background material on continuum mechanics, and a discussion of the classical theory of plasticity. Recent developments in the field are then explored in sections on the Mroz Multisurface model, the Dafalias and Popov Two Surface model, the non-linear kinematic hardening model, the endochronic theory of plasticity, and numerous topics in finite deformation plasticity theory and strain space formulation for plastic deformation. Final chapters introduce the fundamentals of the micromechanics of plastic deformation and the analytical coupling between deformation of individual crystals and macroscopic material response of the polycrystal aggregate. For graduate students and researchers in engineering mechanics, mechanical, civil, and aerospace engineering, Continuum Theory of Plasticity offers a modern, comprehensive introduction to the entire subject of plasticity.

The Mathematical Theory of Plasticity Rodney Hill 1998 First published in 1950, this important and classic book presents a mathematical theory of plastic materials, written by one of the leading exponents.

Plasticity and Creep of Metals Andrew Rusinko 2011-07-24 This book serves both as a textbook and a scientific work. As a textbook, the work gives a clear, thorough and systematic presentation of the fundamental postulates, theorems and principles and their applications of the classical mathematical theories of plasticity and creep. In addition to the mathematical theories, the physical theory of plasticity, the book presents the Budiansky concept of slip and its modification by M. Leonov. Special attention is given to the analysis of the advantages and shortcomings of the classical theories. In its main part, the book presents the synthetic theory of irreversible deformations, which is based on the mathematical Sanders flow plasticity theory and the physical theory, the Budiansky concept of slip. The main peculiarity of the synthetic theory is that the formulae for both plastic and creep deformation, as well their interrelations, can be derived from the single constitutive equation. Furthermore, the synthetic theory, as physical one, can take into account the real processes that take place in solids at irreversible deformation. This widens considerably the potential of the synthetic theory. In the framework of the synthetic theory such problems as creep delay, the Hazen-Kelly effect, the deformation at the break of the load trajectory, the influence of the rate of loading on the stress-strain diagram, creep at the changes of load, creep at

unloading and reversed creep, have been analytically described. In the last chapter, the book shows the solution of some contemporary problems of plasticity and creep: Creep deformation at cyclic abrupt changes of temperature, The influence of irradiation on the plastic and creep deformation, Peculiarities of deformation at the phase transformation of some metals.

Soil Plasticity W.F. Chen 1985-11-01 This book is addressed primarily to civil engineers familiar with such traditional topics as strength of materials, soil mechanics, and theory of elasticity and structures, but less familiar with the modern development of the mathematical theory of soil plasticity necessary to any engineer working under the general heading of nonlinear analysis of soil-structure system. This book will satisfy his needs in the case of the soil medium. It introduces the reader to the theory of soil plasticity and its numerical implementation into computer programs. The theory and method of computer implementation presented here are appropriate for solving nonlinear static dynamic problems in soil mechanics and are applicable for finite difference and finite element computer codes. A sample computer model subroutine is developed and this is used to study some typical soil mechanics problems. With its comprehensive coverage and simple, concise presentation, the book will undoubtedly prove to be very useful for consulting engineers, research and graduate students in geotechnical engineering.

Encyclopaedia of Mathematics (set) Michiel Hazewinkel 1994-02-28 The Encyclopaedia of Mathematics is the most up-to-date, authoritative and comprehensive English-language work of reference in mathematics which exists today. With over 7,000 articles from `A-integral' to `Zygmund Class of Functions', supplemented with a wealth of complementary information, and an index volume providing thorough cross-referencing of entries of related interest, the Encyclopaedia of Mathematics offers an immediate source of reference to mathematical definitions, concepts, explanations, surveys, examples, terminology and methods. The depth and breadth of content and the straightforward, careful presentation of the information, with the emphasis on accessibility, makes the Encyclopaedia of Mathematics an immensely useful tool for all mathematicians and other scientists who use, or are confronted by, mathematics in their work. The Enclyclopaedia of Mathematics provides, without doubt, a reference source of mathematical knowledge which is unsurpassed in value and usefulness. It can be

highly recommended for use in libraries of universities, research institutes, colleges and even schools.
Plasticity Weimin Han 2012-11-19 This book focuses on the theoretical aspects of small strain theory of elastoplasticity with hardening assumptions. It provides a comprehensive and unified treatment of the mathematical theory and numerical analysis. It is divided into three parts, with the first part providing a detailed introduction to plasticity, the second part covering the mathematical analysis of the elasticity problem, and the third part devoted to error analysis of various semi-discrete and fully discrete approximations for variational formulations of the elastoplasticity. This revised and expanded edition includes material on single-crystal and strain-gradient plasticity. In addition, the entire book has been revised to make it more accessible to readers who are actively involved in computations but less so in numerical analysis. Reviews of earlier edition: “The authors have written an excellent book which can be recommended for specialists in plasticity who wish to know more about the mathematical theory, as well as those with a background in the mathematical sciences who seek a self-contained account of the mechanics and mathematics of plasticity theory.” (ZAMM, 2002) “In summary, the book represents an impressive comprehensive overview of the mathematical approach to the theory and numerics of plasticity. Scientists as well as lecturers and graduate students will find the book very useful as a reference for research or for preparing courses in this field.” (Technische Mechanik) "The book is professionally written and will be a useful reference to researchers and students interested in mathematical and numerical problems of plasticity. It represents a major contribution in the area of continuum mechanics and numerical analysis." (Math Reviews)
Applied Plasticity, Second Edition Jagabandhu Chakrabarty 2009-11-05 This book begins with the fundamentals of the mathematical theory of plasticity. The discussion then turns to the theory of plastic stress and its applications to structural analysis. It concludes with a wide range of topics in dynamic plasticity including wave propagation, armor penetration, and structural impact in the plastic range. In view of the rapidly growing interest in computational methods, an appendix presents the fundamentals of a finite-element analysis of metal-forming problems.
Computational Inelasticity J.C. Simo 2006-05-07 A description of the theoretical foundations of inelasticity, its numerical formulation and implementation, constituting a representative sample of state-of-the-art methodology

currently used in inelastic calculations. Among the numerous topics covered are small deformation plasticity and viscoplasticity, convex optimisation theory, integration algorithms for the constitutive equation of plasticity and viscoplasticity, the variational setting of boundary value problems and discretization by finite element methods. Also addressed are the generalisation of the theory to non-smooth yield surface, mathematical numerical analysis issues of general return mapping algorithms, the generalisation to finite-strain inelasticity theory, objective integration algorithms for rate constitutive equations, the theory of hyperelastic-based plasticity models and small and large deformation viscoelasticity. Of great interest to researchers and graduate students in various branches of engineering, especially civil, aeronautical and mechanical, and applied mathematics.
Computational Methods for Plasticity Eduardo A. de Souza Neto 2011-09-21 The subject of computational plasticity encapsulates the numerical methods used for the finite element simulation of the behaviour of a wide range of engineering materials considered to be plastic – i.e. those that undergo a permanent change of shape in response to an applied force. Computational Methods for Plasticity: Theory and Applications describes the theory of the associated numerical methods for the simulation of a wide range of plastic engineering materials; from the simplest infinitesimal plasticity theory to more complex damage mechanics and finite strain crystal plasticity models. It is split into three parts - basic concepts, small strains and large strains. Beginning with elementary theory and progressing to advanced, complex theory and computer implementation, it is suitable for use at both introductory and advanced levels. The book: Offers a self-contained text that allows the reader to learn computational plasticity theory and its implementation from one volume. Includes many numerical examples that illustrate the application of the methodologies described. Provides introductory material on related disciplines and procedures such as tensor analysis, continuum mechanics and finite elements for non-linear solid mechanics. Is accompanied by purpose-developed finite element software that illustrates many of the techniques discussed in the text, downloadable from the book’s companion website. This comprehensive text will appeal to postgraduate and graduate students of civil, mechanical, aerospace and materials engineering as well as applied mathematics and courses with computational mechanics components. It will also be of interest to research engineers, scientists and software developers working in the field of computational solid mechanics.
Mathematical Theory of Elasticity of Quasicrystals and Its Applications Tian-You Fan 2016-09-20 This

interdisciplinary work on condensed matter physics, the continuum mechanics of novel materials, and partial differential equations, discusses the mathematical theory of elasticity and hydrodynamics of quasicrystals, as well as its applications. By establishing new partial differential equations of higher order and their solutions under complicated boundary value and initial value conditions, the theories developed here dramatically simplify the solution of complex elasticity problems. Comprehensive and detailed mathematical derivations guide readers through the work. By combining theoretical analysis and experimental data, mathematical studies and practical applications, readers will gain a systematic, comprehensive and in-depth understanding of condensed matter physics, new continuum mechanics and applied mathematics. This new edition covers the latest developments in quasicrystal studies. In particular, it pays special attention to the hydrodynamics, soft-matter quasicrystals, and the Poisson bracket method and its application in deriving hydrodynamic equations. These new sections make the book an even more useful and comprehensive reference guide for researchers working in Condensed Matter Physics, Chemistry and Materials Science.

Mathematical Theory of Elastic and Elasto-Plastic Bodies J. Necas 2017-02-01 The book acquaints the reader with the basic concepts and relations of elasticity and plasticity, and also with the contemporary state of the theory, covering such aspects as the nonlinear models of elasto-plastic bodies and of large deflections of plates, unilateral boundary value problems, variational principles, the finite element method, and so on.

Nonlinear Problems of Elasticity Stuart Antman 2013-03-14 The scientists of the seventeenth and eighteenth centuries, led by Jas. Bernoulli and Euler, created a coherent theory of the mechanics of strings and rods undergoing planar deformations. They introduced the basic con cepts of strain, both extensional and flexural, of contact force with its com ponents of tension and shear force, and of contact couple. They extended Newton's Law of Motion for a mass point to a law valid for any deformable body. Euler formulated its independent and much subtler complement, the Angular Momentum Principle. (Euler also gave effective variational characterizations of the governing equations.) These scientists breathed life into the theory by proposing, formulating, and solving the problems of the suspension bridge, the catenary, the velaria, the elastica, and the small transverse vibrations of an elastic string. (The level of difficulty of some of these problems is such that even today their descriptions are sel dom vouchsafed to undergraduates. The realization that such profound and

beautiful results could be deduced by mathematical reasoning from fundamental physical principles furnished a significant contribution to the intellectual climate of the Age of Reason.) At first, those who solved these problems did not distinguish between linear and nonlinear equations, and so were not intimidated by the latter. By the middle of the nineteenth century, Cauchy had constructed the basic framework of three-dimensional continuum mechanics on the founda tions built by his eighteenth-century predecessors.

Proceedings 1952

Foundations of the Theory of Elasticity, Plasticity, and Viscoelasticity Eduard Starovoitov 2012-07-18 Foundations of the Theory of Elasticity, Plasticity, and Viscoelasticity details fundamental and practical skills and approaches for carrying out research in the field of modern problems in the mechanics of deformed solids, which involves the theories of elasticity, plasticity, and viscoelasticity. The book includes all modern methods of research as well as the results of the authors' recent work and is presented with sufficient mathematical strictness and proof. The first six chapters are devoted to the foundations of the theory of elasticity. Theory of stress-strain state, physical relations and problem statements, variation principles, contact and 2D problems, and the theory of plates are presented, and the theories are accompanied by examples of solving typical problems. The last six chapters will be useful to postgraduates and scientists engaged in nonlinear mechanics of deformed inhomogeneous bodies. The foundations of the modern theory of plasticity (general, small elastoplastic deformations and the theory of flow), linear, and nonlinear viscoelasticity are set forth. Corresponding research of three-layered circular plates of various materials is included to illustrate methods of problem solving. Analytical solutions and numerical results for elastic, elastoplastic, lineaer viscoelastic and viscoelastoplastic plates are also given. Thermoviscoelastoplastic characteristics of certain materials needed for numerical account are presented in the eleventh chapter. The informative book is intended for scientists, postgraduates and higher-level students of engineering spheres and will provide important practical skills and approaches.

An Introduction to Plasticity William Prager 1959

Plasticity Weimin Han 2006-05-17 Focussing on theoretical aspects of the small-strain theory of hardening elastoplasticity, this monograph provides a comprehensive and unified treatment of the mathematical theory and numerical analysis, exploiting in particular the great advantages gained by placing the theory in a convex analytic

context. Divided into three parts, the first part of the text provides a detailed introduction to plasticity, in which the mechanics of elastoplastic behaviour is emphasised, while the second part is taken up with mathematical analysis of the elastoplasticity problem. The third part is devoted to error analysis of various semi-discrete and fully discrete approximations for variational formulations of the elastoplasticity.

Plasticity Ronaldo I. Borja 2013-06-14 There have been many excellent books written on the subject of plastic deformation in solids, but rarely can one find a textbook on this subject. “Plasticity Modeling & Computation” is a textbook written specifically for students who want to learn the theoretical, mathematical, and computational aspects of inelastic deformation in solids. It adopts a simple narrative style that is not mathematically overbearing, and has been written to emulate a professor giving a lecture on this subject inside a classroom. Each section is written to provide a balance between the relevant equations and the explanations behind them. Where relevant, sections end with one or more exercises designed to reinforce the understanding of the “lecture.” Color figures enhance the presentation and make the book very pleasant to read. For professors planning to use this textbook for their classes, the contents are sufficient for Parts A and B that can be taught in sequence over a period of two semesters or quarters.

Elasticity and Plasticity J. N. Goodier 2016-03-17 This volume comprises two classic essays on the mathematical theories of elasticity and plasticity by authorities in this area of engineering science. Undergraduate and graduate students in engineering as well as professional engineers will find these works excellent texts and references. The Mathematical Theory of Elasticity covers plane stress and plane strain in the isotropic medium, holes and fillets of assignable shapes, approximate conformal mapping, reinforcement of holes, mixed boundary value problems, the third fundamental problem in two dimensions, eigensolutions for plane and axisymmetric states, anisotropic elasticity, thermal stress, elastic waves induced by thermal shock, three-dimensional contact problems, wave propagation, traveling loads and sources of disturbance, diffraction, and pulse propagation. The Mathematical Theory of Plasticity explores the theory of perfectly plastic solids, the theory of strain-hardening plastic solids, piecewise linear plasticity, minimum principles of plasticity, bending of a circular plate, and other problems.

A Survey of Complete Solutions to Limit Design Problems in the Mathematical Theory of Perfect Plasticity (microfilm).

Arthur John Swindells 1971
The Plane Problem of the Mathematical Theory of Plasticity in the Case where the External Forces are Applied Along a Closed Contour S. Khristianovich 1946
A Treatise on the Mathematical Theory of Elasticity Augustus Edward Hough Love 1944-01-01 The most complete single-volume treatment of classical elasticity, this text features extensive editorial apparatus, including a historical introduction. Topics include stress, strain, bending, torsion, gravitational effects, and much more. 1927 edition.
The Catalogue of Computational Material Models Paul Steinmann 2021-03-20 This book gives a comprehensive account of the formulation and computational treatment of basic geometrically linear models in 1D. To set the stage, it assembles some preliminaries regarding necessary modelling, computational and mathematical tools. Thereafter, the remaining parts are concerned with the actual catalogue of computational material models. To this end, after starting out with elasticity as a reference, further 15 different basic variants of material models (5 x each of {visco-elasticity, plasticity, visco-plasticity}, respectively) are systematically explored. The presentation for each of these basic material models is a stand-alone account and follows in each case the same structure. On the one hand, this allows, in the true sense of a catalogue, to consult each of the basic material models separately without the need to refer to other basic material models. On the other hand, even though this somewhat repetitious concept may seem tedious, it allows to compare the formulation and resulting algorithmic setting of the various basic material models and thereby to uncover, in detail, similarities and differences. In particular, the response of each basic material model is analysed for the identical histories (Zig-Zag, Sine, Ramp) of prescribed strain and stress so as to clearly showcase and to contrast to each other the characteristics of the various modelling options.
Physico-Mathematical Theory of High Irreversible Strains in Metals V.M. Greshnov 2019-02-06 Presents a new physical and mathematical theory of irreversible deformations and ductile fracture of metals that acknowledges the continuous change in the structure of materials during deformation and the accumulation of deformation damage. Plastic deformation, viscous destruction, evolution of structure, creep processes, and long-term strength of metals and stress relaxation are described in the framework of a unified approach and model. The

author then expands this into a mathematical model for determining the mechanical characteristics of quasi-samples of standard mechanical properties in deformed semi-finished products.
The Plasticity of Metals a Discussion of Mathematical Theory and Its Application to Civil Engineering Problems Daniel Charles Drucker 1948
A Survey of Complete Solutions to Limit Design Problems in the Mathematical Theory of Perfect Plasticity [microform] Swindells, Arthur John 1971
Theory of Soil Plasticity with Indefinite Angle of Non-coaxiality Shunsuke Takagi 1973 One of the difficulties that have hampered the development of the mathematical theory of soil plasticity was recently overcome by Mandl and Luque. They showed that the non-coaxiality of the principal axes of a stress tensor and a strain-rate tensor can occur only in plane deformation. Their assumption that the angle of non-coaxiality should be a material constant cannot be supported, however, The angle of non-coaxiality should be determined so that the solution to the given problem can exist. It is demonstrated in one of the examples in the report that a well-known solution in which the angle of non-coaxiality is assumed to be zero does violate the assumed boundary condition. The theory was reorganized by using new insights given by Mandl and Luque. It is concluded that still missing is one condition that enables us to determine the angle of non-coaxiality as a function of space. (Author).
Mathematical Programming Methods in Structural Plasticity D. Lloyd Smith 2014-05-04 Civil engineering structures tend to be fabricated from materials that respond elastically at normal levels of loading. Most such materials, however, would exhibit a marked and ductile inelasticity if the structure were overloaded by accident or by some improbable but naturally occuring phenomeon. Indeed, the very presence of such ductility constitutes an important safety provision for large-scale constructions where human life is at risk. In the comprehensive evaluation of safety in structural design, it is therefore unrealistic not to consider the effects of ductility. This book sets out to show that the bringing together of the theory and methods of mathematical programming with the mathematical theory of plasticity furnishes a model which has a unifying theoretical nature and is entirely representative of observed structural behaviour. The contents of the book provide a review of the relevant aspects of mathematical programming and plasticity theory, together with a detailed presentation of the most interesting and potentially useful applications in both framed and continuum structures: ultimate strength and

elastoplastic deformability; shakedown and practical upper bounds on deformation measures; evolutive dynamic response; large displacements and instability; stochastic and fuzzy programming for representing uncertainty in ultimate strength calculations. Besides providing a ready fund of computational algorithms, mathematical programming invests applications in mechanics with a refined mathematical formalism, rich in fundamental theorems, which often gives addi- tional insight into known results and occasionally lead to new ones. In addition to its obvious practical utility, the educational value of the material thoroughly befits a university discipline.
The Thermomechanics of Plasticity and Fracture Gerard A. Maugin 1992-05-21 This book concentrates upon the mathematical theory of plasticity and fracture as opposed to the physical theory of these fields, presented in the thermomechanical framework.
Elasticity and Plasticity / Elastizität und Plastizität Siegfried Flügge 2013-12-19
Nonlinear Evolution Equations Nina Nikolaevna Uraltseva 1995-05-19 This collection focuses on nonlinear problems in partial differential equations. Most of the papers are based on lectures presented at the seminar on partial differential equations and mathematical physics at St. Petersburg University. Among the topics explored are the existence and properties of solutions of various classes of nonlinear evolution equations, nonlinear imbedding theorems, bifurcations of solutions, and equations of mathematical physics (Navier-Stokes type equations and the nonlinear Schrodinger equation). The book will be useful to researchers and graduate students working in partial differential equations and mathematical physics.
Applied Mechanics Reviews 1973
Foundations of the Theory of Plasticity Lazar? Markovich Kachanov 1971

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