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Continuum Mechanics for Engineers An Introduction to Continuum Mechanics Foundations and Applications of Mechanics: Continuum mechanics Continuum Mechanics Continuum Models of Discrete Systems 4 A First Course in Rational Continuum Mechanics Introduction to Continuum Mechanics An Introduction to Continuum Mechanics Continuum Mechanics Introduction to Continuum Mechanics Matrix-Tensor Methods in Continuum Mechanics Mechanics Of Continuous Media (In 2 Vols) Elementary Continuum Mechanics for Everyone Introduction to Linear Elasticity Topics in Applied Continuum Mechanics Nonlinear Continuum Mechanics Principles of Continuum Mechanics Nonlinear Continuum Mechanics for Finite Element Analysis Continuum Mechanics Fundamentals General Continuum Mechanics Geometrical Foundations of Continuum Mechanics Topics in Applied Continuum Mechanics A First Course in Continuum Mechanics A Course in Continuum Mechanics Tensor Algebra and Tensor Analysis for Engineers Continuum Damage Mechanics Rheology and Non-Newtonian Fluids Waves And Rays In Elastic Continua (Fourth Edition) Elements of Continuum Mechanics Continuum Thermodynamics and Material Modelling Variational Principles of Continuum Mechanics Continuum Mechanics Continuum Models of Discrete Systems Variational Principles of Continuum Mechanics with Engineering Applications A One-dimensional Introduction to Continuum Mechanics Introduction to Continuum Mechanics Continuum Mechanics Nonlinear Continuum

Mechanics of Solids Continuum Mechanics using Mathematica®
Nonlinear Continuum Mechanics for Finite Elasticity-Plasticity

Continuum Mechanics for Engineers *2020-05-01*

a bestselling textbook in its first three editions continuum mechanics for engineers fourth edition provides engineering students with a complete concise and accessible introduction to advanced engineering mechanics it provides information that is useful in emerging engineering areas such as micro mechanics and biomechanics through a mastery of this volume s contents and additional rigorous finite element training readers will develop the mechanics foundation necessary to skillfully use modern advanced design tools features provides a basic understandable approach to the concepts mathematics and engineering applications of continuum mechanics updated throughout and adds a new chapter on plasticity features an expanded coverage of fluids includes numerous all new end of chapter problems with an abundance of worked examples and chapter problems it carefully explains necessary mathematics and presents numerous illustrations giving students and practicing professionals an excellent self study guide to enhance their skills

An Introduction to Continuum Mechanics *1981-12-12*

this book presents an introduction to the classical theories of continuum mechanics in particular to the theories of ideal compressible and viscous fluids and to the linear and nonlinear theories of elasticity these theories are important not only because they are applicable to a majority of the problems in continuum mechanics arising in practice but because they form a solid base upon which one can readily construct more complex theories of material behavior further although attention is limited to the classical theories the treatment is modern with a major emphasis

on foundations and structure

Foundations and Applications of Mechanics: Continuum mechanics 2007

after providing the necessary mathematical background needed the book discusses kinematics balance laws and constitutive relations for simple materials major emphasis is placed on discussing relatively new ideas such as material frame indifference the implications of the second law of themodynamics material symmetry etc the text shows how under suitable assumptions the classical theories of fluid mechanics solid mechanics including the linear theory of elasticity and rigid body dynamics follow from the general continuum equations this book is intended as an advanced undergraduate or a graduate level textbook in continuum mechanics and its applications new to the second edition a number of new topics have been discussed some of which are higher order in particular fourth order tensors differentiation of tensors exact solutions to problems in nonlinear linearized elasticity components of tensors and their derivatives with respect to curvilinear coordinates conversion of tensorial expressions to engineering form

Continuum Mechanics 2006-11-10

most books on continuum mechanics focus on elasticity and fluid mechanics but whether student or practicing professional modern engineers need a more thorough treatment to understand the behavior of the complex materials and systems in use today continuum mechanics elasticity plasticity viscoelasticity offers a complete tour of the subject th

Continuum Models of Discrete Systems 4 *1981*

a first course in rational continuum mechanics volume 1 general concepts describes general concepts in rational continuum mechanics and covers topics ranging from bodies and forces to motions and energies kinematics and the stress tensor constitutive relations are also discussed and some definitions and theorems of algebra geometry and calculus are included exercises and their solutions are given as well comprised of four chapters this volume begins with an introduction to rational mechanics by focusing on the mathematical concepts of bodies forces motions and energies systems that provide possible universes for mechanics are described the next chapter explores kinematics with emphasis on bodies placements and motions as well as other relevant concepts like local deformation and homogeneous transplacement the book also considers the stress tensor and cauchy s fundamental theorem before concluding with a discussion on constitutive relations this monograph is designed for students taking a course in mathematics or physics

A First Course in Rational Continuum Mechanics 2016-06-03

continuum mechanics studies the response of materials to different loading conditions the concept of tensors is introduced through the idea of linear transformation in a self contained chapter and the interrelation of direct notation indicial notation and matrix operations is clearly presented a wide range of idealized materials are considered through simple static and dynamic problems and the book contains an abundance of illustrative examples and problems many with solutions through the addition of more advanced material solution of classical

elasticity problems constitutive equations for viscoelastic fluids and finite deformation theory this popular introduction to modern continuum mechanics has been fully revised to serve a dual purpose for introductory courses in undergraduate engineering curricula and for beginning graduate courses

Introduction to Continuum Mechanics *2012-12-02*

this textbook on continuum mechanics reflects the modern view that scientists and engineers should be trained to think and work in multidisciplinary environments a course on continuum mechanics introduces the basic principles of mechanics and prepares students for advanced courses in traditional and emerging fields such as biomechanics and nanomechanics this text introduces the main concepts of continuum mechanics simply with rich supporting examples but does not compromise mathematically in providing the invariant form as well as component form of the basic equations and their applications to problems in elasticity fluid mechanics and heat transfer the book is ideal for advanced undergraduate and beginning graduate students the book features derivations of the basic equations of mechanics in invariant vector and tensor form and specializations of the governing equations to various coordinate systems numerous illustrative examples chapter end summaries and exercise problems to test and extend the understanding of concepts presented

An Introduction to Continuum Mechanics *2007-10-29*

continuum mechanics is a branch of physical mechanics that describes the macroscopic mechanical behavior of solid or fluid

materials considered to be continuously distributed it is fundamental to the fields of civil mechanical chemical and bioengineering this time tested text has been used for over 35 years to introduce junior and senior level undergraduate engineering students as well as graduate students to the basic principles of continuum mechanics and their applications to real engineering problems the text begins with a detailed presentation of the coordinate invariant quantity the tensor introduced as a linear transformation this is then followed by the formulation of the kinematics of deformation large as well as very small the description of stresses and the basic laws of continuum mechanics as applications of these laws the behaviors of certain material idealizations models including the elastic viscous and viscoelastic materials are presented this new edition offers expanded coverage of the subject matter both in terms of details and contents providing greater flexibility for either a one or two semester course in either continuum mechanics or elasticity although this current edition has expanded the coverage of the subject matter it nevertheless uses the same approach as that in the earlier editions that one can cover advanced topics in an elementary way that go from simple to complex using a wealth of illustrative examples and problems it is and will remain one of the most accessible textbooks on this challenging engineering subject significantly expanded coverage of elasticity in chapter 5 including solutions of some 3 d problems based on the fundamental potential functions approach new section at the end of chapter 4 devoted to the integral formulation of the field equations seven new appendices appear at the end of the relevant chapters to help make each chapter more self contained expanded and improved problem sets providing both intellectual challenges and engineering applications

Continuum Mechanics 1988

the purposes of the text are to introduce the engineer to the very important discipline in applied mathematics tensor methods as well as to show the fundamental unity of the different fields in continuum mechanics with the unifying material formed by the matrix tensor theory and to present to the engineer modern engineering problems request inspection copy

Introduction to Continuum Mechanics *2009-07-23*

this volume is written by academician sedov who is considered by many as the leading scientist in mechanics in the ussr this latest fourth edition helps the reader in a relatively short time to master and acquire fully the essence of many geometrical and mechanical theories

Matrix-Tensor Methods in Continuum Mechanics *1990-07-13*

the book opens with a derivation of kinematically nonlinear 3 d continuum mechanics for solids then the principle of virtual work is utilized to derive the simpler kinematically linear 3 d theory and to provide the foundation for developing consistent theories of kinematic nonlinearity and linearity for specialized continua such as beams and plates and finite element methods for these structures a formulation in terms of the versatile budiansky hutchinson notation is used as basis for the theories for these structures and structural elements as well as for an in depth treatment of structural instability

Mechanics Of Continuous Media (In 2 Vols) *1997-06-01*

this augmented and updated fourth edition introduces a new complement of computational tools and examples for each chapter and continues to provide a grounding in the tensor based theory of elasticity for students in mechanical civil aeronautical and biomedical engineering and materials and earth science professor gould s proven approach allows faculty to introduce this subject early on in an educational program where students are able to understand and apply the basic notions of mechanics to stress analysis and move on to advanced work in continuum mechanics plasticity plate and shell theory composite materials and finite element mechanics with the introductory material on the use of matlab students can apply this modern computational tool to solve classic elasticity problems the detailed solutions of example problems using both analytical derivations and computational tools helps student to grasp the essence of elasticity and practical skills of applying the basic mechanics theorem

Elementary Continuum Mechanics for Everyone *2013-02-03*

the foundations of thermoelasticity experiments and theory a phillips 1 introduction 2 the initial yield surface 4 3 the subsequent yield surface 6 4 some theoretical consequences 10 references 13 on the physics and mathematics of self stresses e kroner 1 introduction 22 2 the physical origin of the self stresses 23 3 formulation of the mathematical problem of self stresses 27 4 the method of modified green s functions 30 5 concluding remarks 35 references 38 distortion in micropolar elasticity w nowacki 1 fundamental relations and equations 39 2 principle of virtual work 42 3 theorem of minimum of the complimentary work 43 4

reciprocity theorem 44 5 equations in displacements and rotations 47 6 compatibility equations 51 references 57 the yield criterion in the general case of nonhomogeneous stress and deformation fields j a konig and w olszak 1 introduction 58 2 the plasticity condition 61 3 special cases of the yield condition 62 4 example pure bending 63 5 criteria for neutral passive and active processes 65 vi 6 the flow law 67 references 69 electro magneto elasticity j b alblas 1 introduction 71 2 balance equations 77 3 the jump and boundary conditions 85 4 the constitutive equations 91 5 linearization of the magnetic problem 95 6 magneto elastic waves in the infinite space and in the half space 105 references 114 plasticity and creep theory in engineering mechanics j f besse ling 1 introduction 115 2 limit analysis 117 3

Introduction to Linear Elasticity *2018-07-23*

this textbook on continuum mechanics presents 9 chapters chapters 1 and 2 are devoted to tensor algebra and tensor analysis part i of the book includes the next 3 chapters all the content here is valid for both solid and fluid materials at the end of part i the reader should be able to set up in local spatial material form the fundamental governing equations and inequalities for a continuum mechanics problem part ii of the book chapters 6 to 10 is devoted to presenting some nonlinear constitutive models for nonlinear solid mechanics including finite deformation hyperelasticity finite deformation plasticity finite deformation coupled thermoplasticity and finite deformation contact mechanics the constitutive equations are derived within a thermodynamically consistent framework finite deformation elastoplasticity models are based on a multiplicative decomposition of the deformation gradient and the notion of an intermediate configuration different formulations based on the intermediate configuration the current

or spatial configuration and the material configuration are considered the last chapter is devoted to variational methods in solid mechanics a fundamental topic in computational mechanics the book may be used as a textbook for an advanced master s course on nonlinear continuum mechanics for graduate students in civil mechanical or aerospace engineering applied mathematics or applied physics with an interest in continuum mechanics and computational mechanics

Topics in Applied Continuum Mechanics *2013-11-11*

this senior undergraduate and first year graduate text provides a concise treatment of the subject of continuum mechanics and elasticity

Nonlinear Continuum Mechanics *2023-08-22*

a unified treatment of nonlinear continuum analysis and finite element techniques

Principles of Continuum Mechanics *2017-11-16*

general continuum mechanics provides an integrated and unified study of continuum mechanics

Nonlinear Continuum Mechanics for

Finite Element Analysis *1997-09-28*

this book illustrates the deep roots of the geometrically nonlinear kinematics of generalized continuum mechanics in differential geometry besides applications to first order elasticity and elasto plasticity an appreciation thereof is particularly illuminating for generalized models of continuum mechanics such as second order gradient type elasticity and elasto plasticity after a motivation that arises from considering geometrically linear first and second order crystal plasticity in part i several concepts from differential geometry relevant for what follows such as connection parallel transport torsion curvature and metric for holonomic and anholonomic coordinate transformations are reiterated in part ii then in part iii the kinematics of geometrically nonlinear continuum mechanics are considered there various concepts of differential geometry in particular aspects related to compatibility are generically applied to the kinematics of first and second order geometrically nonlinear continuum mechanics together with the discussion on the integrability conditions for the distortions and double distortions the concepts of dislocation disclination and point defect density tensors are introduced for concreteness after touching on nonlinear fir st and second order elasticity a detailed discussion of the kinematics of multiplicative first and second order elasto plasticity is given the discussion naturally culminates in a comprehensive set of different types of dislocation disclination and point defect density tensors it is argued that these can potentially be used to model densities of geometrically necessary defects and the accompanying hardening in crystalline materials eventually part iv summarizes the above findings on integrability whereby distinction is made between the straightforward conditions for the distortion and the double distortion being integrable and the more involved conditions for the strain metric and the double strain connection being integrable the book addresses readers with an interest in continuum modelling of

solids from engineering and the sciences alike whereby a sound knowledge of tensor calculus and continuum mechanics is required as a prerequisite

Continuum Mechanics Fundamentals *1981*

the foundations of thermoelasticity experiments and theory a phillips 1 introduction 2 the initial yield surface 4 3 the subsequent yield surface 6 4 some theoretical consequences 10 references 13 on the physics and mathematics of self stresses e kroner 1 introduction 22 2 the physical origin of the self stresses 23 3 formulation of the mathematical problem of self stresses 27 4 the method of modified green s functions 30 5 concluding remarks 35 references 38 distortion in micropolar elasticity w nowacki 1 fundamental relations and equations 39 2 principle of virtual work 42 3 theorem of minimum of the complimentary work 43 4 reciprocity theorem 44 5 equations in displacements and rotations 47 6 compatibility equations 51 references 57 the yield criterion in the general case of nonhomogeneous stress and deformation fields j a konig and w olszak 1 introduction 58 2 the plasticity condition 61 3 special cases of the yield condition 62 4 example pure bending 63 5 criteria for neutral passive and active processes 65 vi 6 the flow law 67 references 69 electro magneto elasticity j b alblas 1 introduction 71 2 balance equations 77 3 the jump and boundary conditions 85 4 the constitutive equations 91 5 linearization of the magnetic problem 95 6 magneto elastic waves in the infinite space and in the half space 105 references 114 plasticity and creep theory in engineering mechanics j f besse ling 1 introduction 115 2 limit analysis 117 3

General Continuum Mechanics *2007-01-29*

this is the fourth and revised edition of a well received book that aims at bridging the gap between the engineering course of tensor algebra on the one side and the mathematical course of classical linear algebra on the other side in accordance with the contemporary way of scientific publications a modern absolute tensor notation is preferred throughout the book provides a comprehensible exposition of the fundamental mathematical concepts of tensor calculus and enriches the presented material with many illustrative examples in addition the book also includes advanced chapters dealing with recent developments in the theory of isotropic and anisotropic tensor functions and their applications to continuum mechanics hence this monograph addresses graduate students as well as scientists working in this field in each chapter numerous exercises are included allowing for self study and intense practice solutions to the exercises are also provided

Geometrical Foundations of Continuum Mechanics *2015-03-25*

recent developments in engineering and technology have brought about serious and enlarged demands for reliability safety and economy in wide range of fields such as aeronautics nuclear engineering civil and structural engineering automotive and production industry this in turn has caused more interest in continuum damage mechanics and its engineering applications this book aims to give a concise overview of the current state of damage mechanics and then to show the fascinating possibility of this promising branch of mechanics and to provide researchers engineers and graduate students with an intelligible and self contained textbook the book consists of two parts and an appendix

part i is concerned with the foundation of continuum damage mechanics basic concepts of material damage and the mechanical representation of damage state of various kinds are described in chapters 1 and 2 in chapters 3 5 irreversible thermodynamics thermodynamic constitutive theory and its application to the modeling of the constitutive and the evolution equations of damaged materials are descried as a systematic basis for the subsequent development throughout the book part ii describes the application of the fundamental theories developed in part i to typical damage and fracture problems encountered in various fields of the current engineering important engineering aspects of elastic plastic or ductile damage their damage mechanics modeling and their further refinement are first discussed in chapter 6 chapters 7 and 8 are concerned with the modeling of fatigue creep creep fatigue and their engineering application damage mechanics modeling of complicated crack closure behavior in elastic brittle and composite materials are discussed in chapters 9 and 10 in chapter 11 applicability of the local approach to fracture by means of damage mechanics and finite element method and the ensuing mathematical and numerical problems are briefly discussed a proper understanding of the subject matter requires knowledge of tensor algebra and tensor calculus at the end of this book therefore the foundations of tensor analysis are presented in the appendix especially for readers with insufficient mathematical background but with keen interest in this exciting field of mechanics

Topics in Applied Continuum Mechanics *1974-08-19*

this book gives a brief but thorough introduction to the fascinating subject of non newtonian fluids their behavior and mechanical properties after a brief introduction of what characterizes non

newtonian fluids in chapter 1 some phenomena characteristic of non newtonian fluids are presented in chapter 2 the basic equations in fluid mechanics are discussed in chapter 3 deformation kinematics the kinematics of shear flows viscometric flows and extensional flows are the topics in chapter 4 material functions characterizing the behavior of fluids in special flows are defined in chapter 5 generalized newtonian fluids are the most common types of non newtonian fluids and are the subject in chapter 6 some linearly viscoelastic fluid models are presented in chapter 7 in chapter 8 the concept of tensors is utilized and advanced fluid models are introduced the book is concluded with a variety of 26 problems solutions to the problems are ready for instructors

A First Course in Continuum Mechanics 1977

seismology as a branch of mathematical physics is an active subject of both research and development its reliance on computational and technological advances continuously motivates the developments of its underlying theory the fourth edition of waves and rays in elastic continua responds to these needs the book is both a research reference and a textbook its careful and explanatory style which includes numerous exercises with detailed solutions makes it an excellent textbook for the senior undergraduate and graduate courses as well as for an independent study used in its entirety the book could serve as a sole textbook for a year long course in quantitative seismology its parts however are designed to be used independently for shorter courses with different emphases the book is not limited to quantitive seismology it can serve as a textbook for courses in mathematical physics or applied mathematics

A Course in Continuum Mechanics *1971*

a complete treatment of continuum thermodynamics with applications to material modelling packed with examples and illustrations

Tensor Algebra and Tensor Analysis for Engineers *2015-03-25*

thereareabout500booksonvariationalprinciples theyareconcernedmostlywith the mathematical aspects of the topic the major goal of this book is to discuss the physical origin of the variational principles and the intrinsic interrelations between them for example the gibbs principles appear not as the rst principles of the theory of thermodynamic equilibrium but as a consequence of the einstein formula for thermodynamic uctuations the mathematical issues are considered as long as they shed light on the physical outcomes and or provide a useful technique for direct study of variational problems thebookisacompletelyrewrittenversionoftheauthor smonographvariational principles of continuum mechanics which appeared in russian in 1983 i have been postponing the english translation because i wished to include the variational pr ciples of irreversible processes in the new edition reaching an understanding of this subject took longer than i expected in its nal form this book covers all aspects of the story the part concerned with irreversible processes is tiny but it determines the accents put on all the results presented the other new issues included in the book are entropy of microstructure variational principles of vortex line dynamics va ational principles and integration in functional spaces some stochastic variational problems variational principle for probability densities of local elds in composites with random structure variational theory of turbulence these topics

have not been covered previously in monographic literature

Continuum Damage Mechanics *2012-02-23*

written for beginners this text provides coverage of the basic concepts general principles and applications of continuum mechanics it deals with matrices vectors and tensors specifically tailored to the needs of continuum mechanics in addition it develops the concepts and principles common to all areas in solid and fluid mechanics with a common notation and terminology

Rheology and Non-Newtonian Fluids *2013-07-25*

approach your problems from the right end it isn t that they can t see the solution it is and begin with the answers then one day that they can t see the problem perhaps you will find the final question g k chesterton the scandal of father the hermit clad in crane feathers in r brown the point of a pin van gulik s the chinese maze murders growing specialization and diversification have brought a host of monographs and textbooks on increasingly specialized topics however the tree of knowledge of mathematics and related fields does not grow only by putting forth new branches it also happens quite often in fact that branches which were thought to be completely disparate are suddenly seen to be related further the kind and level of sophistication of mathematics applied in various sciences has changed drastically in recent years measure theory is used non trivially in regional and theoretical economics algebraic geometry interacts with physics the minkowsky lemma coding theory and the structure of water meet one another in packing and covering theory quantum fields crystal defects and mathematical programming profit from homotopy theory lie

algebras are relevant to filtering and prediction and electrical engineering can use stein spaces and in addition to this there are such new emerging subdisciplines as experimental mathematics cfd completely integrable systems chaos synergetics and large scale order which are almost impossible to fit into the existing classification schemes they draw upon widely different sections of mathematics

Waves And Rays In Elastic Continua (Fourth Edition) *2020-09-24*

many textbooks on continuum mechanics plunge students in at the deep end of three dimensional analysis and applications however a striking number of commonplace models of our physical environment are based entirely within the dynamics of a one dimensional continuum this introductory text therefore approaches the subject entirely within such a one dimensional framework the principles of the mathematical modeling of one dimensional media constitute the book s backbone these concepts are elucidated with a diverse selection of applications ranging from tidal dynamics and dispersion in channels to beam bending algal blooms blood flow and the greenhouse effect the book is ideally suited to elementary undergraduate courses as it makes no use of multivariable calculus a number of graded problems are included at the end of each section

Elements of Continuum Mechanics *2006*

this textbook treats solids and fluids in a balanced manner using thermodynamic restrictions on the relation between applied forces and material responses this unified approach can be appreciated by engineers physicists and applied mathematicians with some

background in engineering mechanics it has many examples and about 150 exercises for students to practice the higher mathematics needed for a complete understanding is provided in the early chapters this subject is essential for engineers involved in experimental or numerical modeling of material behavior

Continuum Thermodynamics and Material Modelling *2024-06-30*

most books on continuum mechanics focus on elasticity and fluid mechanics but whether student or practicing professional modern engineers need a more thorough treatment to understand the behavior of the complex materials and systems in use today continuum mechanics elasticity plasticity viscoelasticity offers a complete tour of the subject that includes not only elasticity and fluid mechanics but also covers plasticity viscoelasticity and the continuum model for fatigue and fracture mechanics in addition to a broader scope this book also supplies a review of the necessary mathematical tools and results for a self contained treatment the author provides finite element formulations of the equations encountered throughout the chapters and uses an approach with just the right amount of mathematical rigor without being too theoretical for practical use working systematically from the continuum model for the thermomechanics of materials coverage moves through linear and nonlinear elasticity using both tensor and matrix notation plasticity viscoelasticity and concludes by introducing the fundamentals of fracture mechanics and fatigue of metals requisite mathematical tools appear in the final chapter for easy reference continuum mechanics elasticity plasticity viscoelasticity builds a strong understanding of the principles equations and finite element formulations needed to solve real engineering problems

Variational Principles of Continuum Mechanics *2009-09-18*

the aim of the book is the presentation of the fundamental mathematical and physical concepts of continuum mechanics of solids in a unified description so as to bring young researchers rapidly close to their research area accordingly emphasis is given to concepts of permanent interest and details of minor importance are omitted the formulation is achieved systematically in absolute tensor notation which is almost exclusively used in modern literature this mathematical tool is presented such that study of the book is possible without permanent reference to other works

Continuum Mechanics *1994-05-31*

this book examines mathematical tools principles and fundamental applications of continuum mechanics providing a solid basis for a deeper study of more challenging problems in elasticity fluid mechanics plasticity piezoelectricity ferroelectricity magneto fluid mechanics and state changes the work is suitable for advanced undergraduates graduate students and researchers in applied mathematics mathematical physics and engineering

Continuum Models of Discrete Systems 1981

nonlinear continuum mechanics for finite elasticity plasticity empowers readers to fully understand the constitutive equation of finite strain an essential piece in assessing the deformation strength of materials and safety of structures the book starts by providing a foundational overview of continuum mechanics elasticity and plasticity then segues into more sophisticated topics

such as multiplicative decomposition of deformation gradient tensor with the isoclinic concept and the underlying subloading surface concept the subloading surface concept insists that the plastic strain rate is not induced suddenly at the moment when the stress reaches the yield surface but it develops continuously as the stress approaches the yield surface which is crucially important for the precise description of cyclic loading behavior then the exact formulations of the elastoplastic and viscoplastic constitutive equations based on the multiplicative decomposition are expounded in great detail the book concludes with examples of these concepts and modeling techniques being deployed in real world applications table of contents 1 mathematical basics 2 general curvilinear coordinate system 3 description of deformation rotation in convected coordinate system 4 deformation rotation rate tensors 5 conservation laws and stress tensors 6 hyperelastic equations 7 development of elastoplastic constitutive equations 8 multiplicative decomposition of deformation gradient tensor 9 multiplicative hyperelastic based plastic and viscoplastic constitutive equations 10 friction model finite sliding theory covers both the fundamentals of continuum mechanics and elastoplasticity while also introducing readers to more advanced topics such as the subloading surface model and the multiplicative decomposition among others approaches finite elastoplasticity and viscoplasticty theory based on multiplicative decomposition and the subloading surface model provides a thorough introduction to the general tensor formulation details for the embedded curvilinear coordinate system and the multiplicative decomposition of the deformation gradient

Variational Principles of Continuum Mechanics with Engineering

Applications 1986-03-31

A One-dimensional Introduction to Continuum Mechanics *1994*

Introduction to Continuum Mechanics *2009-03-16*

Continuum Mechanics 2006-11-10

Nonlinear Continuum Mechanics of Solids *2013-11-11*

Continuum Mechanics using Mathematica® 2008-11-01

Nonlinear Continuum Mechanics for Finite Elasticity-Plasticity *2020-06-19*

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