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The development of the theory and application of viscoelastic stress analysis in

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the past few ... Such a procedure is referred to here as streamlining since, as in the context of fluid mechanics, it ...

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This second edition extends the rigorous, self-contained exposition of the theory for viscoelastic wave propagation in layered ...

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exploration geophysics, engineering, solid mechanics, and acoustics.

~~Viscoelastic Waves and Rays in Layered Media~~

Upon being crosslinked sufficiently, a chemical molecular network (rubber or elastomer) is formed that transforms the

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polymer into a viscoelastic solid, which does not flow. Like its precursor polymer ...

~~Chapter 5: The Viscoelastic Behavior of Rubber~~

(Image: Wyss Institute at Harvard University) The achievement is reported in Nature Nanotechnology ("Viscoelastic

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surface electrode arrays ... the assumption that they had to be made of metal and ...

~~Electrodes that flow to fit the body~~

"Viscoelastic fluids, like ketchup, silly putty and toothpaste, have very strange properties -- when squeezed slowly, they flow like a fluid, but at faster speeds, they act like an

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elastic solid ...

~~A new 'twist' to break viscoelastic liquid bridges~~

When two non-conforming solids are brought into contact they touch initially at a single point or along a line. Under the action of the slightest load they deform in the

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vicinity of their point of ...

~~Chapter 4: Normal Contact of Elastic Solids~~
~~Hertz Theory~~

This field of one-dimensional gas dynamics or fluid mechanics is an excellent example of the ... In the previous chapters we have treated wave propagation in fluids, elastic

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Solids, and viscoelastic ...

~~Mathematics of Wave Propagation~~

Emphasis on polymer viscoelasticity, shape memory materials, other material systems.

Graduate students interested in understanding the mechanics and materials aspects of advanced material systems.

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~~MECH_ENG 456: Mechanics of Advanced
Materials~~

One of the hallmarks of all living tissues, particularly the brain and spinal cord, is that they are "viscoelastic"—that ... had to be made of metal and solid plastic to be effective.

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~~New metal-free hydrogel electrodes flex to fit the body's many shapes, avoiding damage to organs~~

One of the hallmarks of all living tissues, particularly the brain and spinal cord, is that they are “ viscoelastic ... they had to be made of metal and solid plastic to be

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~~New hydrogel-based electrodes snugly conform to the body's myriad shapes~~
This course deals with advanced theory regarding stress, strain, and deformation or flow in solids, liquids ... plasticity, and fluid mechanics under wide range of conditions.

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80-minute lectures are ...

~~Course CEE 521: Continuum mechanics~~

HA, a major component of synovial fluid (31), contributes substantially to its viscoelastic properties (32). The molecular weight of HA present in synovial fluid can range from 0.5 to 7 MDa depending ...

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~~Fast nanoparticle rotational and translational diffusion in synovial fluid and hyaluronic acid solutions~~

137: 1373-1380 Erkmen, R.E. and Bradford, M.A. (2011) “ Non-linear Quasi-viscoelastic Behavior of Composite Beams ...
Discovery-based and Cooperative Learning

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in Mechanics of Solids ” , Proceedings of ...

~~Emre Erkmen, Ph.D., P.Eng.~~

The 2009 Tribology Gold Medal was awarded to Academician Irina Goryacheva in recognition of her outstanding achievements in tribology; in particular for her meritorious work in the field of contact

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~~Irina Goryacheva~~

(Y, F) Prerequisite: MEM 663. Summarizes mechanics of materials Courses. Covers vector and tensor analysis, indicial notation, theory of stress, equilibrium equations, displacements and small strains, ...

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Mechanics, MECH.2150 Plastics Process
Engin ... glass-rubber transition and
polymer viscoelastic behavior. Pre-req:
PLAS.4030 Mechanical Behavior Polymers,
and PLAS.5060 Polymer structure and
Props, ...

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~~Course Listing for Plastics Engineering~~

You will grow your skills across core engineering disciplines by studying modules such as Advanced Solid Mechanics and Advanced Thermodynamics ... non-Newtonian biofluid simulations, viscoelastic

...

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Viscoelastic Solids covers the mathematical theory of viscoelasticity and physical insights, causal mechanisms, and practical applications. The book: presents a development of the theory, addressing both transient and dynamic aspects as well as

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emphasizing linear viscoelasticity synthesizes the structure of the theory with the aim of developing physical insight illustrates the methods for the solution of stress analysis problems in viscoelastic objects explores experimental methods for the characterization of viscoelastic materials describes the phenomenology of

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viscoelasticity in a variety of materials, including polymers, metals, high damping alloys, rock, piezoelectric materials, cellular solids, dense composite materials, and biological materials analyzes high damping and extremely low damping provides the theory of viscoelastic composite materials, including examples of various types of

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Solids and the relationships between structure and mechanical properties contains examples on the use of viscoelastic materials in preventing and alleviating human suffering Viscoelastic Solids also demonstrates the use of viscoelasticity for diverse applications, such as earplugs, gaskets, computer disks, satellite stability,

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medical diagnosis, injury prevention, vibration abatement, tire performance, sports, spacecraft explosions, and music.

This book focuses on the mechanical response in viscoelastic media under isothermal and nonisothermal conditions. The viscoelastic response covered in this

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book is observed in a wide variety of common materials: polymers and plastics, metals and alloys at elevated temperatures, concrete, soils, road construction and building materials, biological tissues, and foodstuffs. Emphasizing the mechanical behavior of solid polymers subjected to physical aging, the book analyzes

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constitutive equations in thermoviscoelasticity and compares the results of numerical simulation with experimental data. After covering linear viscoelastic media at small strains, a clear approach to nonlinear constitutive equations in viscoelasticity at small strains and at finite strains is developed. The book

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concludes with coverage of constitutive relations in thermoviscoelasticity which account for thermally-induced changes both in elastic moduli and relaxation spectra. Written for specialists in mechanical and chemical engineering in the fields of manufacturing polymer and polymer-composite articles, this book will also appeal

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to specialists in applied and industrial mathematics, mechanics of continua and polymer physics who study the response of solid polymers to thermomechanical stimuli.

Understanding viscoelasticity is pertinent to design applications as diverse as earplugs, gaskets, computer disks, satellite stability,

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medical diagnosis, injury prevention, vibration abatement, tire performance, sports, spacecraft explosions, and music.

This book fits a one-semester graduate course on the properties, analysis, and uses of viscoelastic materials. Those familiar with the author's precursor book, *Viscoelastic Solids*, will see that this book contains many

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updates and expanded coverage of the materials science, causes of viscoelastic behavior, properties of materials of biological origin, and applications of viscoelastic materials. The theoretical presentation includes both transient and dynamic aspects, with emphasis on linear viscoelasticity to develop physical insight.

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Methods for the solution of stress analysis problems are developed and illustrated. Experimental methods for characterization of viscoelastic materials are explored in detail. Viscoelastic phenomena are described for a wide variety of materials, including viscoelastic composite materials. Applications of viscoelasticity and

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viscoelastic materials are illustrated with case studies.

Pioneering presentation of basic theory, experimental methods and results, solution of boundary value problems. Six

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appendices. Updated bibliography. /div

Reissue of Encyclopedia of Physics /
Handbuch der Physik, Volume VIa The
mechanical response of solids was first
reduced to an organized science of fairly
general scope in the nineteenth century. The
theory of small elastic deformations is in the

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main the creation of CAUCHY, who, correcting and simplifying the work of NAVIER and POISSON, through an astounding application of conjoined scholarship, originality, and labor greatly extended in breadth the shallowest aspects of the treatments of particular kinds of bodies by GALILEO, LEIBNIZ, JAMES

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BERNOULLI, PARENT, DANIEL BERNOULLI, EULER, and COULOMB. Linear elasticity became a branch of mathematics, cultivated wherever there were mathematicians. The magisterial treatise of LOVE in its second edition, 1906 - clear, compact, exhaustive, and learned - stands as the summary of the classical theory. It is one

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of the great "gaslight works" that in BOCHNER'S words! "either do not have any adequate successor[s] '" or, at least, refuse to be super seded . . . ; and so they have to be reprinted, in ever increasing numbers, for active research and reference", as long as State and Society shall permit men to learn mathe matics by, for, and of men's

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Solids. Abundant experimentation on solids was done during the same century. Usually the materials arising in nature, with which experiment most justly concerns itself, do not stoop easily to the limitations classical elasticity posits.

Viscoelastic Structures covers the four basic

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problems in the mechanics of viscoelastic solids and structural members: construction of constitutive models for the description of thermoviscoelastic behavior of polymers; mathematical modeling of manufacturing advanced composite materials; optimal-design of structural members and technological processes of their fabrication;

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and stability analysis for thin-walled structural members driven by time-varying loads. This book familiarizes the reader with state-of-the-art mathematical models for advanced materials and processes, and demonstrates their applications in modeling and simulating specific manufacturing processes. Viscoelastic Structures also

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Solids demonstrates the effects of material, geometrical, and technological parameters on the characteristic features of viscoelastic structures. 1Presents state-of-the-art mathematical models and methods which serve for the analysis of advanced technological processes 1 Includes numerous examples to demonstrate theory which have

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not been included in previous literature
1 Employs one consistent, user-friendly method to study a number of technological processes
1 Features unique approach to aging materials
1 Appendices cover background material on tensor calculus, kinematics with finite strains, stochastic differential equations, and evolutionary

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This book provides a systematic and self-consistent introduction to the nonlinear continuum mechanics of solids, from the main axioms to comprehensive aspects of the theory. The objective is to expose the most intriguing aspects of elasticity and

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solids viscoelasticity with finite strains in such a way as to ensure mathematical correctness, on the one hand, and to demonstrate a wide spectrum of physical phenomena typical only of nonlinear mechanics, on the other. A novel aspect of the book is that it contains a number of examples illustrating surprising behaviour in materials with finite strains, as

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well as comparisons between theoretical predictions and experimental data for rubber-like polymers and elastomers. The book aims to fill a gap between mathematicians specializing in nonlinear continuum mechanics, and physicists and engineers who apply the methods of solid mechanics to a wide range of problems in

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civil and mechanical engineering, materials science, and polymer physics. The book has been developed from a graduate course in applied mathematics which the author has given for a number of years.

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