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Mechanics After the
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Lasers Unified Strength Theory
and Its Applications Stability of
Dynamical Systems Mechanics
of Wave-Seabed-Structure
Interactions Microwave Circuit
Analysis and Amplifier Design

This book emphasizes in detail the applicability of the Optimal Homotopy Asymptotic Method to various engineering problems. It is a continuation of the book "Nonlinear Dynamical Systems in Engineering: Some Approximate Approaches", published at Springer in 2011 and it contains a great amount of practical models from various fields of engineering such as classical and fluid mechanics, thermodynamics, nonlinear oscillations, electrical machines and so on. The main structure of the book consists of 5 chapters. The first chapter is introductory while the second chapter is devoted to a short history of the development of homotopy

methods, including the basic ideas of the Optimal Homotopy Asymptotic Method. The last three chapters, from Chapter 3 to Chapter 5, are introducing three distinct alternatives of the Optimal Homotopy Asymptotic Method with illustrative applications to nonlinear dynamical systems. The third chapter deals with the first alternative of our approach with two iterations. Five applications are presented from fluid mechanics and nonlinear oscillations. The Chapter 4 presents the Optimal Homotopy Asymptotic Method with a single iteration and solving the linear equation on the first approximation. Here are treated 32 models from

different fields of engineering such as fluid mechanics, thermodynamics, nonlinear damped and undamped oscillations, electrical machines and even from physics and biology. The last chapter is devoted to the Optimal Homotopy Asymptotic Method with a single iteration but without solving the equation in the first approximation. Novel mathematical and modeling approaches to problems in graded materials, biological materials, fluid mechanics and more Covers nanomechanics, multi-scale modeling, interface mechanics and microstructure This series volume contains 128 not previously published research presentations on

using nonlinear mechanics to understand and model a wide variety of materials, including polymers, metals and composites, as well as subcellular and cellular tissues. Focus is on numerical and physics approaches to representing multiscale relationships within complex solids and fluids systems, with applications in materials science, energy storage, medical diagnostics and treatment, and biotechnology. TABLE OF CONTENTS Preface Committees SESSION 1: INVITED LECTURES Micro-Macro Analysis of Creep and Damage Behavior of Multi-Pass Welds Some New Developments in Non-Linear

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Study on Long-Term Correlation of CO and CO₂ from Vehicle Emissions on Roadsides with the Detrended Fluctuation Analysis Method Bottleneck Effect on a Bidirectional Two-Lane Mixed Traffic Flow In 1993, the first edition of The Electrical Engineering Handbook set a new standard for breadth and depth of coverage in an engineering reference work. Now, this classic has been substantially revised and updated to include the latest information on all the important topics in electrical engineering today. Every electrical engineer should have an opportunity to expand his expertise with this definitive

guide. In a single volume, this handbook provides a complete reference to answer the questions encountered by practicing engineers in industry, government, or academia. This well-organized book is divided into 12 major sections that encompass the entire field of electrical engineering, including circuits, signal processing, electronics, electromagnetics, electrical effects and devices, and energy, and the emerging trends in the fields of communications, digital devices, computer engineering, systems, and biomedical engineering. A compendium of physical, chemical, material, and mathematical data

completes this comprehensive resource. Every major topic is thoroughly covered and every important concept is defined, described, and illustrated. Conceptually challenging but carefully explained articles are equally valuable to the practicing engineer, researchers, and students. A distinguished advisory board and contributors including many of the leading authors, professors, and researchers in the field today assist noted author and professor Richard Dorf in offering complete coverage of this rapidly expanding field. No other single volume available today offers this combination of broad coverage and depth of

exploration of the topics. The Electrical Engineering Handbook will be an invaluable resource for electrical engineers for years to come. Photonics in Switching provides a broad, balanced overview of the use of optics or photonics in switching, from materials and devices to system architecture. The chapters, each written by an expert in the field, survey the key technologies, setting them in context and highlighting their benefits and possible applications. This book is a valuable resource for those working in the communications industry, either at the professional or student level, who do not have extensive

background knowledge or the underlying physics of the technology. A rigorous yet accessible graduate textbook covering both fundamental and advanced optimization theory and algorithms. This book presents and extend different known methods to solve different types of strong nonlinearities encountered by engineering systems. A better knowledge of the classical methods presented in the first part lead to a better choice of the so-called "base functions". These are absolutely necessary to obtain the auxiliary functions involved in the optimal approaches which are presented in the second part. Every chapter introduces a

distinct approximate method applicable to nonlinear dynamical systems. Each approximate analytical approach is accompanied by representative examples related to nonlinear dynamical systems from to various fields of engineering. This book aims to provide a systemic viewpoint for enterprise to establish the warranty chain management system. This book includes warranty management practice, reverse logistics, product reliability engineering, data statistics and analysis, industry 4.0 and artificial intelligence, circular supply chain and sustainable design, and other basic theories and case descriptions. The author

has many years' experience in academic and industrial management, and provides a management framework that especially takes into account (1) the implementation aspect - promotion of warranty plan and statistical analysis of data; (2) strategic aspect - digital application and sustainable development, with an overall system building point of view to describe the steps of warranty chain management step by step. There are rich industry cases in this book which has highly reference value for students, researchers and practitioners. Also this book fits to be used as teaching and training material in engineering management,

which builds an overview of the product life cycle management from warranty service till the recovery stage. The environmental crisis is the most prominent challenge humanity has ever had to battle with, and humanity is currently failing. The Anthropocene—or so called ‘age of humans’—is indeed a period when the survival of humanity has never been so much at risk. This book locates itself in the field of critical green political theory. Fremaux's analysis of the current environmental crisis calls for us to embrace radical shifts in our modes of being; or, in other words, socially progressive innovations that will be described within the

unique framework of "Green Republicanism." In offering a constructive and emancipatory delineation of what could be considered an ecological civilization that is respectful of its natural environment and social differences, this book describes how to shift from an ‘arrogant speciesism’ and materialistic lifestyle to a post-anthropocentric ecological humanism focusing on the ‘good life’ within ecological limits. This new political regime calls for a radical reinvention of our societies, a decentering of the humans within our metaphysical worldview, and a withdrawal of the capitalist technosphere at the benefit of the biosphere. It

will require a new economic paradigm that replaces the unsustainable capitalist logic of growth by sustainable degrowth and steady economics. Rooted in ethical thinking and political philosophy, this book seeks to offer a concrete roadmap of how sustainable societies can be fostered. This encyclopedia adopts a wider definition for the concept of ocean engineering. Specifically, it includes (1) offshore engineering: fixed and floating offshore oil and gas platforms; pipelines and risers; cables and moorings; buoy technology; foundation engineering; ocean mining; marine and offshore renewable energy; aquaculture

engineering; and subsea engineering; (2) naval architecture: ship and special marine vehicle design; intact and damaged stability; technology for energy efficiency and green shipping; ship production technology; decommissioning and recycling; (3) polar and Arctic Engineering: ice mechanics; ice-structure interaction; polar operations; polar design; environmental protection; (4) underwater technologies: AUV/ROV design; AUV/ROV hydrodynamics; maneuvering and control; and underwater-specific communicating and sensing systems for AUV/ROVs. It summarizes the A-Z of the background and application

knowledge of ocean engineering for use by ocean scientists and ocean engineers as well as nonspecialists such as engineers and scientists from all disciplines, economists, students, and politicians. Ocean engineering theories, ocean devices and equipment, ocean design and operation technologies are described by international experts, many from industry and each entry offers an introduction and references for further study, making current technology and operating practices available for future generations to learn from. The book also furthers our understanding of the current state of the art, leading to new

and more efficient technologies with breakthroughs from new theory and materials. As the land resources approach the exploitation limit, ocean resources are becoming the next choice for the sustainable development. As such, ocean engineering is vital in the 21st century. This book provides the information necessary for the reader to achieve a thorough understanding of all aspects of QW lasers - from the basic mechanism of optical gain, through the current technological state of the art, to the future technologies of quantum wires and quantum dots. In view of the growing importance of QW lasers, this book should be read by all

those with an active interest in laser science and technology, from the advanced student to the experienced laser scientist.

* The first comprehensive book-length treatment of quantum well lasers * Provides a detailed treatment of quantum well laser basics * Covers strained quantum well lasers * Explores the different state-of-the-art quantum well laser types * Provides key information on future laser technologies This book constitutes the refereed proceedings of the Third International Conference on Embedded Software and Systems, ICESS 2007, held in Daegu, Korea, May 2007. The 75 revised full papers cover

embedded architecture, embedded hardware, embedded software, HW-SW co-design and SoC, multimedia and HCI, pervasive/ubiquitous computing and sensor network, power-aware computing, real-time systems, security and dependability, and wireless communication. Faculty in the targeted manipulation of the genetic and metabolic composition of organisms, combined with unprecedented computational power, is forging a niche for a new subspecialty of biotechnology called metabolic engineering. First published in 2002, this book introduces researchers and advanced students in biology and engineering to

methods of optimizing biochemical systems of biotechnological relevance. It examines the development of strategies for manipulating metabolic pathways, demonstrates the need for effective systems models, and discusses their design and analysis, while placing special emphasis on optimization. The authors propose power-law models and methods of biochemical systems theory toward these ends. All concepts are derived from first principles, and the text is richly illustrated with numerous graphs and examples throughout. Special features include: nontechnical and technical introductions to

models of biochemical systems; a review of basic methods of model design and analysis; concepts of optimization; and detailed case studies. Bothered and nagged by persistent pain and chronic fatigue day after day? This short book shows why your mouth is the place to look to your vitality. Discover if you have a structurally impaired mouth (crowded teeth in bad bite and deficient jaws with clicking joints and teeth grinding), and how it can choke your airway, break your teeth, and create pain and fatigue. The clincher: Bedrest cannot fix an Impaired Mouth, nor its ripple effects like jaw, neck and back pain, anxiety, pain, anxiety, depression, waking up

tired, and more. Yet in 2022, it is not on the radar of nearly all doctors and dentists. This richly illustrated book is written by 3-time bestselling author, Dr. Felix Liao, a leader of dentistry's evolution into better overall health by treating the mouth. The keys to free you from the prison of pain and fatigue lie in your mouth. And Dr. Liao's WholeHealth solutions come without shots, drills, or drugs. You, too, can refill your empty tank and enjoy feeling younger. Start reading this short book now. Climate Change Solutions represents an application of critical theory to examine proposed solutions to climate change. Drawing from Marx's

negative conception of ideology, the authors illustrate how ideology continues to conceal the capital-climate contradiction or the fundamental incompatibility between growth-dependent capitalism and effectively and justly mitigating climate change. Dominant solutions to climate change that offer minor changes to the current system fail to address this contradiction. However, alternatives like degrowth involve a shift in priorities and power relations and can offer new systemic arrangements that confront and move beyond the capital-climate contradiction. While there are clear barriers to a systemic

transition that prioritizes social and ecological well-being, such a transition is possible and desirable. Systems of coupled non-linear differential equations arise in science and engineering are inherently nonlinear and difficult to find exact solutions. However, in the late nineties, Liao introduced Optimal Homotopy Analysis Method (OHAM), and it allows us to construct accurate approximations to the systems of coupled nonlinear differential equations. This book provides the latest research on the role of nutrients in the prevention and treatment of neurological disorders. It discusses dietary supplements and dietary

restrictions for combating neurological disorders, including Alzheimer's disease, Parkinson's disease, stroke, and epilepsy. The book also explains the impact of different nutrients such as herbal products, algae, micronutrients in stimulating the brain and central nervous system during abnormal functions. It covers the effect of the nutrients on the function of neurotransmitters, their stimulatory effect in autism, dementia, Alzheimer's, and other neuropathological states. The book also defines the mechanistic effects of neuroprotective and psychoprotective effects of natural food in repairing brain damage.

This book is essential reading for neuroscientists and neurologists, and healthcare professionals. The global environment has significantly changed due to a number of factors such as industrial pollution, expansion of agricultural land way beyond the fringe forest zones, destruction of virgin forests, loss of quality agricultural lands due to soil erosion, loss of global wildlife and biodiversity, climate change, global warming, devastating forest fires, floods, draughts, melting of glaciers to mention a few. Human or anthropogenic impacts are in turn devastating the planet with our attention being shifted only to the

shinning aspect of our civilizations. The most alarming fact about this hidden factor is that they are all directly or indirectly impacted by human activities in some way or other. The present work, Environment at Crossroads deals with various environmental problems like climate change, global warming, food security, bioremediation of waste, oil spills, and problems of heavy metal toxicity, control strategies like use of gene therapy, conservation of mangroves, revival of river Vishwamitri and role of plant and animals in biodiversity conservation is discussed. Engineering applications offer benefits and opportunities

across a range of different industries and fields. By developing effective methods of analysis, results and solutions are produced with higher accuracy. Numerical and Analytical Solutions for Solving Nonlinear Equations in Heat Transfer is an innovative source of academic research on the optimized techniques for analyzing heat transfer equations and the application of these methods across various fields. Highlighting pertinent topics such as the differential transformation method, industrial applications, and the homotopy perturbation method, this book is ideally designed for engineers, researchers, graduate

students, professionals, and academics interested in applying new mathematical techniques in engineering sciences. An in-depth look at the mechanics of combined stresses imposed on the seabed from wave action and marine infrastructure. Innovations and Advances in Computing, Informatics, Systems Sciences, Networking and Engineering This book includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Computer Science, Informatics, and Systems Sciences, and Engineering. It includes selected papers from the conference proceedings of

the Eighth and some selected papers of the Ninth International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2012 & CISSE 2013). Coverage includes topics in: Industrial Electronics, Technology & Automation, Telecommunications and Networking, Systems, Computing Sciences and Software Engineering, Engineering Education, Instructional Technology, Assessment, and E-learning. · Provides the latest in a series of books growing out of the International Joint Conferences on Computer, Information, and Systems Sciences, and

Engineering; · Includes chapters in the most advanced areas of Computing, Informatics, Systems Sciences, and Engineering; · Accessible to a wide range of readership, including professors, researchers, practitioners and students. Solving nonlinear problems is inherently difficult, and the stronger the nonlinearity, the more intractable solutions become. Analytic approximations often break down as nonlinearity becomes strong, and even perturbation approximations are valid only for problems with weak nonlinearity. This book introduces a powerful new analytic method for This book thoroughly describes a

theory concerning the yield and failure of materials under multi-axial stresses - the Unified Strength Theory, which was first proposed by the author and has been frequently quoted since. It provides a system of yield and failure criteria adopted for most materials, from metals to rocks, concretes, soils, and polymers. This new edition includes six additional chapters: General behavior of Strength theory function; Visualization of the Unified Strength Theory; Equivalent Stress of the UST and Comparisons with other criteria; Economic Signification of the UST; General form of failure criterion; Beauty of Strength Theories. It is

intended for researchers and graduate students in various fields, including engineering mechanics, material mechanics, plasticity, soil mechanics, rock mechanics, mechanics of metallic materials and civil engineering, hydraulic engineering, geotechnical engineering, mechanical engineering and military engineering. Microwave Devices, Circuits and Subsystems for Communications Engineering provides a detailed treatment of the common microwave elements found in modern microwave communications systems. The treatment is thorough without being unnecessarily mathematical.

The emphasis is on acquiring a conceptual understanding of the techniques and technologies discussed and the practical design criteria required to apply these in real engineering situations. Key topics addressed include: Microwave diode and transistor equivalent circuits Microwave transmission line technologies and microstrip design Network methods and s-parameter measurements Smith chart and related design techniques Broadband and low-noise amplifier design Mixer theory and design Microwave filter design Oscillators, synthesisers and phase locked loops Each chapter is written by specialists in their field and the whole is

edited by experience authors whose expertise spans the fields of communications systems engineering and microwave circuit design. Microwave Devices, Circuits and Subsystems for Communications Engineering is suitable for senior electrical, electronic or telecommunications engineering undergraduate students, first year postgraduate students and experienced engineers seeking a conversion or refresher text. Includes a companion website featuring: Solutions to selected problems Electronic versions of the figures Sample chapter "Homotopy Analysis Method in Nonlinear Differential

Equations" presents the latest developments and applications of the analytic approximation method for highly nonlinear problems, namely the homotopy analysis method (HAM). Unlike perturbation methods, the HAM has nothing to do with small/large physical parameters. In addition, it provides great freedom to choose the equation-type of linear sub-problems and the base functions of a solution. Above all, it provides a convenient way to guarantee the convergence of a solution. This book consists of three parts. Part I provides its basic ideas and theoretical development. Part II presents the HAM-based Mathematica

package BVPh 1.0 for nonlinear boundary-value problems and its applications. Part III shows the validity of the HAM for nonlinear PDEs, such as the American put option and resonance criterion of nonlinear travelling waves. New solutions to a number of nonlinear problems are presented, illustrating the originality of the HAM. Mathematica codes are freely available online to make it easy for readers to understand and use the HAM. This book is suitable for researchers and postgraduates in applied mathematics, physics, nonlinear mechanics, finance and engineering. Dr. Shijun Liao, a distinguished professor

of Shanghai Jiao Tong University, is a pioneer of the HAM. This book discusses chemical engineering and processing, presenting selected contributions from PAIC 2019. It covers interdisciplinary technologies and sciences, like drug-delivery systems, nanoscale technology, environmental control, modelling and computational methods. The book also explores interdisciplinary aspects of chemical and biochemical engineering interconnected with process system engineering, process safety and computer science. This book outlines the promise of the field of the Cognitive Internet of Things when it is

applied to cognitive buildings. After an introduction, the authors discuss the goals of cognitive buildings such as operation in a more efficient, flexible, interactive, intuitive, and sustainable way. They go on to outline the benefits that these technologies promise to building owners, occupants, and their environments that range from reducing energy consumption and carbon footprint to promoting health, well-being, and productivity. The authors outline technologies that provide buildings and equipment with the ability to collect, aggregate, and analyze data and how this information can be collected by sensors and

related to internal conditions and settings, energy consumption, user requests, and preferences to maintain comfort and save energy. This book is of interest to practitioners, researchers, students, and professors in IoT and smart cities. Demonstrating the latest research and analysis in the area of through-life engineering services (TES), this book utilizes case studies and expert analysis from an international array of practitioners and researchers - who together represent multiple manufacturing sectors: aerospace, railway and automotive - to maximize reader insights into the field of

through-life engineering services. As part of the EPSRC Centre in Through-life Engineering Services program to support the academic and industrial community, this book presents an overview of non-destructive testing techniques and applications and provides the reader with the information needed to assess degradation and possible automation of through-life engineering service activities. The latest developments in maintenance-repair-overhaul (MRO) are presented with emphasis on cleaning technologies, repair and overhaul approaches and planning and digital assistance. The impact of these technologies on sustainable

enterprises is also analyzed. This book will help to support the existing TES community and will provide future studies with a strong base from which to analyze and apply technological trends to real world examples. The depletion of petroleum-derived fuel and environmental concerns have prompted many millennials to consider biofuels as alternative fuel sources. But completely replacing petroleum-derived fuels with biofuels is currently impossible in terms of production capacity and engine compatibility. Nevertheless, the marginal replacement of diesel with biofuel could delay the depletion of petroleum resources and abate the radical

climate change caused by automotive pollutants. Energy security and climate change are the two major driving forces for worldwide biofuel development, and also have the potential to stimulate the agro-industry. The development of biofuels as alternative and renewable sources of energy has become critical in national efforts towards maximum self-reliance, the cornerstone of our energy security strategy. At the same time, the production of biofuels from various types of biomass such as plants, microbes, algae and fungi is now an ecologically viable and sustainable option. This book describes the biotechnological advances in biofuel production

from various sources, while also providing essential information on the genetic improvement of biofuel sources at both the conventional and genomic level. These innovations and the corresponding methodologies are explained in detail. Sustainable Resource Management Learn how current technologies can be used to recover and reuse waste products to reduce environmental damage and pollution In this two-volume set, Sustainable Resource Management: Technologies for Recovery and Reuse of Energy and Waste Materials delivers a compelling argument for the importance of the widespread

adoption of a holistic approach to enhanced water, energy, and waste management practices. Increased population and economic growth, urbanization, and industrialization have put sustained pressure on the world's environment, and this book demonstrates how to use organics, nutrients, and thermal heat to better manage wastewater and solid waste to deal with that reality. The book discusses basic scientific principles and recent technological advances in current strategies for resource recovery from waste products. It also presents solutions to pressing problems associated with energy production during waste management and

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