Mechanical Engineering and Solid Mechanics

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Committee coordinator(s)

Noël Challamel
Université de Bretagne-Sud, Lorient
noel.challamel@univ-ubs.fr

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Topics covered

Beam Mechanics
Bifurcation
Composite Materials
Continuum Damage
Mechanics
Continuum
Micromechanics
Dynamics
Elasticity
Finite Element Method
Fracture Mechanics
Gradient Mechanics
Homogenization
Mechanics of Materials
Meshfree Methods

Nanomechanics
Non-smooth Systems
Nonlinear Mechanics
Nonlocal Mechanics
Plasticity
Plate and Shell Modeling
Poromechanics
Probabilistic Mechanics
Rheology
Stability
Structural Mechanics
Thermodynamics
Viscoelasticity,
Viscoplasticity
Forthcoming Sets

Mathematical and Mechanical Engineering coordinated by Abdelkhalak El Hami
Micromechanics coordinated by Djimédo Kondo
Reliability of Multiphysical Systems coordinated by Abdelkhalak El Hami

Forthcoming Titles

Analysis of Failures of Embedded Mechatronic Systems (in 2 volumes) by El Hami Abdelkhalak, Pougnet Philippe
Anisotropic Behavior of Polycrystals by Kondo Djimédo, Abdul-Latif Akrum
Asymptotic Theory for Structures by Marigo Jean-Jacques
Calculation Methods in Transient Dynamics by Combescure Alain et al.
Constrained Motion in Mechanical Systems by Udwadia F.E.
Embedded Mechatronic Systems 1 & 2 by El Hami Abdelkhalak, Pougnet Philippe
Forming and Micro-forming of Small-size Metal Materials by Hug Eric, Keller Clement
Galilean Mechanics and Thermodynamics of Continua by de Saxcé Géry, Vallée Claude
Heat Transfers in Polymer Composite Materials by Boyard Nicolas
Homogeneization and Periodic Structures by Sab Karam, Lebée Arthur
Instabilities and Buckling by Combescure Alain et al.
Micromechanics, Continuum Damage Mechanics and Fracture Mechanics by Kondo Djimédo, Dormieux Luc
Multiscale Analysis of Rods Suspensions by Chinesta Francesco et al.
Nanomechanics by Murmu Tony
Non-local Structural Mechanics by Murmu Tony, Adhikari Sondipon, McCarthy Michael
Nonlinear Beam and Cable Mechanics in Engineering Applications by Luongo Angelo, Zulli Daniele
Qualitative Analysis of Nonsmooth Dynamics by Leger Alain, Pratt Elaine
Rheology of Non-spherical Particle Suspensions by Chinesta Francesco, Ausias Gilles
The Rayleigh-Ritz Method for Structural Analysis
Sinniah Ilanko, University of Waikato, New Zealand, Luis E. Monterrubio, Robert Morris
University, PA, USA

Coordinated by Noël Challamel

ISBN: 9781848216389 • 2014 • 252 pages • USD 145.00 • ISTE-WILEY

This book is a presentation of the theory behind the Rayleigh–Ritz (R–R) method, as well as a discussion of the choice of admissible functions and the use of penalty methods, including recent developments such as using negative inertia and bi-penalty terms.

While presenting the mathematical basis of the R–R method, the authors also give simple explanations and analogies to make it easier to understand. Examples include calculation of natural frequencies and critical loads of structures and structural components, such as beams, plates, shells and solids. MATLAB codes for some common problems are also supplied.

Complete table of contents at http://www.iste.co.uk/index.php?f=a&ACTION=View&id=759

Sustainable Masonry
Stability and Behavior of Structures
Thierry Ciblac, National School of Architecture of Paris and Jean-Claude Morel, French Ministry of Sustainability

Coordinated by Noël Challamel

ISBN: 9781848214958 • 2014 • 304 pages • USD 145.00 • ISTE-WILEY

This book introduces readers to and promotes understanding of the mechanical stability of masonry structures in a contemporary context. This approach will allow contractors to carry out diagnostics on existing heritage and to design new structures.

Contents

Part 1. Technologies and Construction Process
1. Introduction to Sustainable Masonry.
2. Earth and Stone Materials.
This fully updated and revised 3rd edition addresses the entire field of mechanical vibration and shock as one of the most important types of load and stress applied to structures, machines and components in the real world. Examples include everything from the regular and predictable loads applied to turbines, motors or helicopters by the spinning of their constituent parts to the ability of buildings to withstand damage from wind loads or explosions, and the need for cars to maintain structural integrity in the event of a crash.

Mechanical Vibration and Shock Analysis – Third Edition
Volume 1 – Sinusoidal Vibration
Christian Lalanne, Consultant

Contents
1. The Need.
2. Basic Mechanics.
4. Impulse and Step Responses.
5. Sinusoidal Vibration.
7. Non-viscous Damping.
8. Swept Sine.

Mechanical Vibration and Shock Analysis – Third Edition
Volume 2 – Mechanical Shock
Christian Lalanne, Consultant

Contents
5. Kinematics of Simple Shocks.
9. Simulation of Pyroshocks.
The vast majority of vibrations encountered in a real-world environment are random in nature. Such vibrations are intrinsically complicated, but this volume describes the process enabling the simplification of the analysis required, and the analysis of the signal in the frequency domain.

**Contents**

3. RMS Value of Random Vibration.
7. Statistics of Extreme Values.
10. First Passage at a Given Level of Response of a One-degree-of-freedom Linear System to a Random Vibration.

In this volume, which is devoted to the calculation of fatigue damage, the author explores the various hypotheses and models used to describe the behavior of material suffering fatigue and the laws of fatigue accumulation.

**Contents**

2. Accumulation of Fatigue Damage.
4. Fatigue Damage by One-degree-of-freedom Mechanical System.
5. Standard Deviation of Fatigue Damage.
6. Fatigue Damage using other Assumptions for Calculation.
7. Low Cycle Fatigue.

This volume focuses on specification development in accordance with the principle of tailoring.

**Contents**

3. Fatigue Damage Spectrum of a Sinusoidal Vibration.
5. Fatigue Damage Spectrum of a Shock.
7. Uncertainty Factor.
8. Aging Factor.
9. Test Factor.
10. Specification Development.
Mechanics and Uncertainty
Maurice Lemaire, French Institute for Advanced Mechanics, Clermont-Ferrand, France

Coordinated by Pierre Devalan

ISBN: 9781848216297 • 2014 • 176 pages • USD 99.00 • ISTE-WILEY

The aim of this book is to encourage reflection on scientific advances relating to mechanical design in an uncertain context, and to introduce the main tools used by engineers to justify their innovations and demonstrate an acceptable balance between performance, robustness and reliability. It highlights advances in the domain, whilst also identifying areas where conceptual progress still needs to be made.

Mécanique et incertain – ISBN: 9781784050320

The above title is published in French by ISTE Editions (www.iste-editions.fr)

Fractional Calculus with Applications in Mechanics
Wave Propagation, Impact and Variational Principles
Teodor M. Atanackovic et al.

Coordinated by Noël Challamel

ISBN: 9781848216792 • 2014 • 432 pages • USD 175.00 • ISTE-WILEY

Both books Fractional Calculus with Applications in Mechanics contain various applications of fractional calculus to the fields of classical mechanics. They study problems in fields such as viscoelasticity of fractional order, lateral vibrations of a rod of fractional order type, lateral vibrations of a rod positioned on fractional order viscoelastic foundations, diffusion-wave phenomena, heat conduction, wave propagation, forced oscillations of a body attached to a rod, impact and variational principles of a Hamiltonian type.

Fractional Calculus with Applications in Mechanics
Vibrations and Diffusion Processes
Teodor M. Atanackovic et al.

Coordinated by Noël Challamel

ISBN: 9781848214170 • 2014 • 336 pages • USD 170.00 • ISTE-WILEY

Contents

Part 1. Mathematical Preliminaries, Definitions and Properties of Fractional Integrals and Derivatives
1. Mathematical Preliminaries.
2. Basic Definitions and Properties of Fractional Integrals and Derivatives.

Part 2. Mechanical Systems
4. Vibrations with Fractional Dissipation.
7. Fractional Heat Conduction Equations.
Structural Dynamic Analysis with Generalized Damping Models

Volume 1 – Description
Sondipon Adhikari, Swansea University, Wales

Coordinated by Noël Challamel

ISBN: 9781848215214 • 2013 • 368 pages • USD 145.00 • ISTE-WILEY

Contents
1. Introduction to Damping Models and Analysis Methods.
2. Dynamics of Undamped and Viscously Damped Systems.
5. Linear Systems with General Non-Viscous Damping.

These two volumes are the first comprehensive study to cover vibration problems with general non-viscous damping. The author draws on his considerable research experience to produce a text covering: parametric sensitivity of damped systems; identification of viscous damping; identification of non-viscous damping; and some tools for the quantification of damping.

Structural Dynamic Analysis with Generalized Damping Models

Volume 2 – Identification
Sondipon Adhikari, Swansea University, Wales

Coordinated by Noël Challamel

ISBN: 9781848216709 • 2013 • 272 pages • USD 125.00 • ISTE-WILEY

Contents
2. Identification of Viscous Damping.
3. Identification of Non-viscous Damping.
4. Quantification of Damping

Materials and Structures under Shock and Impact

Patrice Bailly, Ecole nationale supérieure d’ingénieurs de Bourges, France

Mechanical Engineering and Solid Mechanics Series

ISBN: 9781848216518 • 2013 • 336 pages • USD 145.00 • ISTE-WILEY

Contents
Part 1. Dynamics of Solids
Part 2. Dynamic of Structures

This book presents a didactic approach starting with the theoretical elements of the mechanics of materials and structures, in order to develop their applications in the cases of shocks and impacts.
Mechanical Engineering and Solid Mechanics

Published Titles

Mathematical Models of Beam and Cables
Angelo Luongo and Daniele Zulli, University of L’Aquila, Italy

Coordinated by Noël Challamel

ISBN: 9781848214217 • 2013 • 384 pages • USD 175.00 • ISTE-WILEY

The authors of this book present an overview of the broad field of the mechanics of one-dimensional structures. They formulate nonlinear models of elastic and visco-elastic one-dimensional continuous structures (beams and cables), and also deal with several models of increasing complexity.

Contents

1. A One-Dimensional Beam Metamodel.
   2. Straight Beams.
   3. Curved Beams.
   4. Internally Constrained Beams.
   5. Flexible Cables.
   7. Locally-Deformable Thin-Walled Beams.
   8. Distortion-Constrained Thin-Walled Beams.

Yield Design
Jean Salençon, Ecole Polytechnique and ENPC, Marne-la-Vallée, France

Coordinated by Noël Challamel

ISBN: 9781848215405 • 2013 • 256 pages • USD 105.00 • ISTE-WILEY

This title introduces the concept of Yield Design and the core of this theory. It presents the simple example of a truss structure in order to give an outline of the method and recalls the fundamentals of this model in its primal formulation.

Contents

1. Origins and Topicality of a Concept.
   2. An Introductory Example to the Yield Design Approach.
   8. Optimality and Probability Approaches of Yield Design.
  11. Yield Design of Plates Subjected to Pure Bending.

Uncertainty and Optimization in Structural Mechanics
Abdelkhalak El Hami, INSA Rouen, France and Bouchaib Radi, Faculty of Sciences and Technology, Settat, Morocco

Coordinated by Bernard Dubuisson

ISBN: 9781848215177 • 2013 • 144 pages • USD 75.00 • ISTE-WILEY

This book includes the most recent ideas coming from research and industry in the field of optimization, reliability and the recognition of accompanying uncertainties.

Contents

1. Uncertainty.
   2. Reliability in Mechanical Systems.
   3. Optimal Structural Design.
   5. Robust Optimization.
   6. Reliability Optimization.
---

**Full-Field Measurements and Identification in Solid Mechanics**

Edited by Michel Grédiac, Blaise Pascal University, Clermont-Ferrand and François Hild, ENS Cachan, France

This timely book presents cutting-edge developments by experts in the field on the rapidly developing and scientifically challenging area of full-field measurement techniques used in solid mechanics – including photoelasticity, grid methods, deflectometry, holography, speckle interferometry and digital image correlation. The evaluation of strains and the use of the measurements in subsequent parameter identification techniques to determine material properties are also presented.

ISBN: 9781848212947 • 2012 • 496 pages • USD 195.00 • ISTE-WILEY

**Contents**

Complete table of contents at http://www.iste.co.uk/index.php?f=a&ACTI ON=View&id=402

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**Mechanical Engineering Education**

Edited by J. Paulo Davim, University of Aveiro, Portugal

This title covers mechanical engineering higher education with a particular emphasis on quality assurance and the improvement of academic institutions, mechatronics education and the transfer of knowledge between university and industry.

ISBN: 9781848213814 • 2012 • 192 pages • USD 95.00 • ISTE-WILEY

**Contents**

1. Quality Assurance in Greek HEIs: Convergence or Divergence with European Models?
2. Mechatronics Education.

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**Non-smooth Deterministic or Stochastic Discrete Dynamical Systems – Applications to Models with Friction or Impact**

Jérôme Bastien, University Lyon 1, Frédéric Bernardin, CETE Lyon and Claude-Henri Lamarque, ENTPE, France

**Coordinated by Noël Challamel**

This book contains theoretical and application-oriented methods to treat models of dynamical systems involving non-smooth nonlinearities.

ISBN: 9781848215252 • 2013 • 512 pages • USD195.00 • ISTE-WILEY

**Contents**

1. Some Simple Examples.
2. Theoretical Deterministic Context.
5. Systems with Friction.
Fracture Mechanics
Volume 1 – Analysis of Reliability and Quality Control
by Ammar Grous, CEGEP de l’Outaouais, Gatineau, Quebec, Canada

Fracture Mechanics is subdivided into three volumes: the first volume presents the majority of the laws of statistical distributions as well as their specific characteristics.

ISBN: 9781848214408 • 2012 • 272 pages • USD 95.00 • ISTE-WILEY

Contents
1. Elements of Analysis of Reliability and Quality Control.
2. Estimates, Testing Adjustments and Testing the Adequacy of Statistical Distributions.
3. Modeling Uncertainty

Fracture Mechanics
Volume 2 – Applied Reliability
by Ammar Grous, CEGEP de l’Outaouais, Gatineau, Quebec, Canada

The second volume covers the analysis of adjustment tests suited to correctly validating the justified use of the laws conforming to the behavior of the materials and structures under study.

ISBN: 9781848214415 • 2012 • 368 pages • USD 145.00 • ISTE-WILEY

Contents
1. Fracture Mechanisms by Fatigue.
3. Analysis of the Reliability of Materials and Structures by the Bayesian Approach.
5. Reliability Indices.
6. Fracture Criteria Reliability Methods through an Integral Damage Indicator.
7. Monte Carlo Simulation.

Fracture Mechanics
Volume 3 – Applied Quality Control
by Ammar Grous, CEGEP de l’Outaouais, Gatineau, Quebec, Canada

The third volume adds a pragmatic and supportive character to the previous volumes by focusing on case studies using corrected exercises that readers will find extremely useful.

ISBN: 9781848214422 • 2012 • 288 pages • USD 125.00 • ISTE-WILEY

Contents
1. Quality Control.
2. Quality Control Case Studies.
3. Case Studies.
Fracture Mechanics and Crack Growth
Naman Recho, Blaise Pascal University Clermont II, France

ISBN: 9781848213067 • 2012 • 512 pages • USD 247.00 • ISTE-WILEY

Contents

1. Introduction.
2. Part 1. Stress Field Analysis Close to the Crack Tip
5. Fracture Mechanics.
7. Crack Growth Prediction in Elements of Steel Structures Submitted to Fatigue.

Carbon Nanotubes and Nanosensors
Vibrations, Buckling and Ballistic Impact
Isaac Elishakoff, Florida Atlantic University, USA et al.

ISBN: 9781848213456 • 2012 • 448 pages • USD 197.00 • ISTE-WILEY

Contents

Complete table of contents at http://www.iste.co.uk/index.php?f=a&ACTION=ViewItem&id=460

Mechanics of Solid Interfaces
Edited by Muriel Braccini, CNRS and Michel Dupeux, Joseph Fourier University, Grenoble, France

ISBN: 9781848213739 • 2012 • 320 pages • USD 145.00 • ISTE-WILEY

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**Backlist Titles (published prior to 2012)**

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<td>Tomasz Krysinski, Consultant and François Malburet, ENSAM, Aix-en-Provence, France</td>
<td>9781848212015</td>
<td>2011</td>
<td>368</td>
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<td><strong>Multidisciplinary Design Optimization in Computational Mechanics</strong></td>
<td>Edited by Piotr Breitkopf and Rajan Filomeno Coelho, UTC, France</td>
<td>9781848211384</td>
<td>2010</td>
<td>576</td>
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<td>Patrick Paultre, University of Sherbrooke, Canada</td>
<td>9781848210639</td>
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<td><strong>Biotribology</strong></td>
<td>Edited by J. Paulo Davim, University of Aveiro, Portugal</td>
<td>9781848212756</td>
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<td>Maurice Lemaire, French Institute for Advanced Mechanics, Clermont-Ferrand, France</td>
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<td>Alain Berlioz, Toulouse University and Philippe Trompette, Consultant, France</td>
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<td>2009</td>
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<td>Alain Girard and Nicolas Roy, Intespace, France</td>
<td>9781848210042</td>
<td>2008</td>
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<td>9781847040251</td>
<td>2007</td>
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<td><strong>X-ray Diffraction by Polycrystalline Materials</strong></td>
<td>René Guinebretière, ENS de Céramiques Industrielles, Limoges, France</td>
<td>9781905209217</td>
<td>2007</td>
<td>376</td>
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<td><strong>Mechanical Vibrations</strong></td>
<td>Tomasz Krysinski, Eurocopter and François Malburet, ENSAM, Aix-en-Provence, France</td>
<td>9781905209293</td>
<td>2007</td>
<td>384</td>
<td>USD 215.00</td>
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ISTE Contacts

Sami Ménascé, President and Managing Director – s.menasce@iste.co.uk
Raphaël Ménascé, Vice-President – +44 208 879 4588 – r.menasce@iste.co.uk

General Administration
Chantal Ménascé — +44 208 879 4582 – c.menasce@iste.co.uk

Editorial and Production
Rebecca Edge, Editorial Manager – +44 208 879 4585 – r.edge@iste.co.uk
Ludovic Moulard, Acquisition Editor – +44 208 879 4584 – l.moulard@iste.co.uk

Scientific Board Members

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