

Multiscale 2010

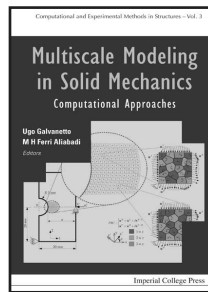
Computational and Experimental Methods in Structures – Vol. 3
MULTISCALE MODELING IN SOLID MECHANICS

Computational Approaches

edited by **Ugo Galvanetto** &

M H Ferri Aliabadi (Imperial College London, UK)

This unique volume presents the state of the art in the field of multiscale modeling in solid mechanics, with particular emphasis on computational approaches. For the first time, contributions from both leading experts in the field and younger promising researchers are combined to give a comprehensive description of the recently proposed techniques and the engineering problems tackled using these techniques. The book begins with a detailed introduction to the theories on which different multiscale approaches are based, with regards to linear homogenisation as well as various nonlinear approaches. It then presents advanced applications of multiscale approaches applied to nonlinear mechanical problems. Finally, the novel topic of materials with self-similar structure is discussed.



352pp Sept 2009
 978-1-84816-307-2 US\$128 £96

TEXTBOOK

HOMOGENIZATION METHODS FOR MULTISCALE MECHANICS

by **Chiang C Mei** (Massachusetts Institute of Technology, USA) &
Bogdan Vernescu (Worcester Polytechnic Institute, USA)

Key Features

- Primary emphasis on the derivation of approximate equations. Less effort is devoted to their solutions and the implied physical significance
- Limits the mathematics to the level commonly taught to graduate students of engineering and physical sciences

Contents: Introductory Examples of Homogenization Method; Diffusion in a Composite; Seepage in Rigid Porous Media; Dispersion in Shear Flows; Deformable Porous Media; Wave Propagation in Inhomogeneous Media; Elastic Composites.

Readership: Graduate students and researchers in applied mathematics and engineering science.

350pp (approx.) Feb 2010
 978-981-4282-44-4 US\$80 £60

Series in Contemporary Applied Mathematics – Vol. 12
MULTI-SCALE PHENOMENA IN COMPLEX FLUIDS

Modeling, Analysis and Numerical Simulation

edited by **Thomas Y Hou** (California Institute of Technology, USA),

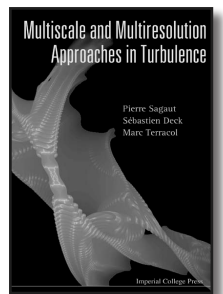
Chun Liu (Penn State University, USA) &

Jian-Guo Liu (University of Maryland, USA)

Multi-Scale Phenomena in Complex Fluids is a collection of lecture notes delivered during the first two series of mini-courses from “Shanghai Summer School on Analysis and Numerics in Modern Sciences”, which was held in 2004 and 2006 at Fudan University, Shanghai, China.

This review volume of 5 chapters, covering various fields in complex fluids, places emphasis on multi-scale modeling, analyses and simulations. It will be of special interest to researchers and graduate students who want to work in the field of complex fluids.

380pp Jun 2009
 978-981-4273-25-1 US\$94 £71



MULTISCALE AND MULTIREOLUTION APPROACHES IN TURBULENCE

by **Pierre Sagaut** (Université Pierre et Marie Curie, France),

Sébastien Deck & **Marc Terracol**

(French National Aerospace Research Establishment (ONERA), France)

“... the text is rather complete, clearly presented, and definitely pleasant to read. More space is devoted to discussions rather than equations, and the authors were careful to provide numerous figures to illustrate key ideas.”

Mathematical Reviews

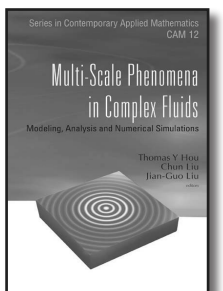
This unique book gives a general unified presentation of the use of the multiscale/multiresolution approaches in the field of turbulence. The coverage ranges from statistical models developed for engineering purposes to multiresolution algorithms for the direct computation of turbulence. It provides the only available up-to-date reviews dealing with the latest and most advanced turbulence models (including LES, VLES, hybrid RANS/LES, DES) and numerical strategies.

It provides the only available up-to-date reviews dealing with the latest and most advanced turbulence models (including LES, VLES, hybrid RANS/LES, DES) and numerical strategies.

Key Features

- The only book to cover the whole field of turbulent modeling

356pp Jun 2006
 978-1-86094-650-9 US\$135 £78



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THE DIAGONAL INFINITY

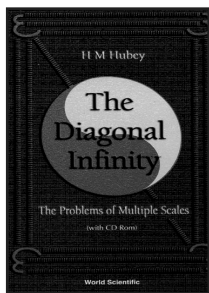
Problems of Multiple Scales
(With CD-ROM)

by **H M Hubey** (Montclair State University, USA)

"This book is well written and contains interesting philosophical ideas."

Zentralblatt MATH

Contents: Diagonal of Diagonalization; Diagonal of a Single Dimension: Redefinition Limit Ordinal; Infinite Numbers; Simple Orthogonal Functions and Other Periodic Functions; More Parametric Fractals and Transfinites Again; The Iteration Machine; Linear Equations and Periodicity; Intermittency and Fluctuating Frequency; Different Kind of Intermittency; Serial Language or Parallel Picture; Semantics of Connectives; Continuous Infinite Valued Logics; Knowledge and Provability; The Turing Test and Intelligence; Life's Metalogical Koans; and other topics.



544pp Dec 1998
978-981-02-3081-4 US\$58 £39

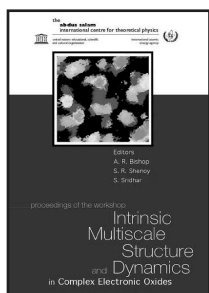
INTRINSIC MULTISCALE STRUCTURE AND DYNAMICS IN COMPLEX ELECTRONIC OXIDES

Proceedings of the Workshop
ICTP, Trieste, Italy

1 – 4 July 2002

edited by **A R Bishop** (Los Alamos National Laboratory, USA),
S R Shenoy (ICTP, Italy) & **S Sridhar** (Northeastern University, USA)

There is considerable interest in the intrinsically multiscale structure and dynamics of complex electronic oxides, especially since these materials include those of technological importance, such as colossal magnetoresistance manganites and cuprate high temperature superconductors. Current microscopies have revealed static and dynamic multiscale patterns in charge positioning, lattice structure and magnetic orientation, that respond to both external stress and magnetic field. These self-organized patterns include charge and orbital ordering; stripes in strain/spin; and labyrinth-like conductance modulations. The materials exhibit nanoscale phase segregation and mesoscale inhomogeneous clustering, and their phase transitions can have a percolative character. This volume presents experimental and theoretical work on these exciting new developments in condensed matter physics and materials science.



232pp Jun 2003
978-981-238-268-9 US\$104 £79

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Series on Quality, Reliability and Engineering Statistics – Vol. 11

LIFE-TIME DATA

Statistical Models and Methods

by **Jayant V Deshpande** & **Sudha G Purohit** (University of Pune, India)

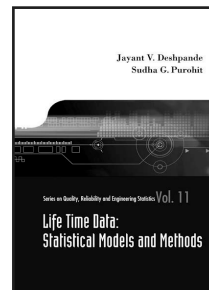
"One of the main strengths of this book is that it introduces the public domain R software and nicely explains how it can be used in computations of methods presented in the book ... the monograph would be useful to some applied researchers in related fields."

Technometrics

Contents: Ageing; Some Parametric Families of Probability Distributions; Parametric Analysis of Survival Data; Nonparametric Estimation of the Survival Function; Tests for Exponentiality; Two Sample Non-parametric Problem; Proportional Hazards Model: A Method of Regression; Analysis of Competing Risks; Repairable Systems.

Readership: Graduate students, academics and researchers in probability and statistics, industrial engineering, decision sciences and bioinformatics.

260pp Jan 2006
978-981-256-607-2 US\$65 £36
978-981-256-697-3(pbk) US\$29 £18



Series in Biostatistics – Vol. 3

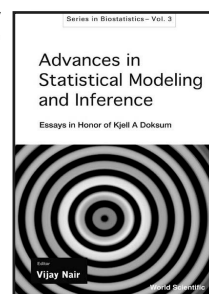
ADVANCES IN STATISTICAL MODELING AND INFERENCE

Essays in Honor of Kjell A Doksum

edited by **Vijay Nair** (University of Michigan, USA)

This volume provides an up-to-date overview of recent advances in statistical modeling and inference. Written by renowned researchers from across the world, it discusses flexible models, semi-parametric methods and transformation models, nonparametric regression and mixture models, survival and reliability analysis, and re-sampling techniques. With its coverage of methodology and theory as well as applications, the book is an essential reference for researchers, graduate students, and practitioners.

700pp Mar 2007
978-981-270-369-9 US\$209 £121



TEXTBOOK

FINITE ELEMENT MODELING OF MULTISCALE PHENOMENA

by **Vahid Nassehi** (Loughborough University, UK) & **Mahmoud Parvazinia** (Iran Polymer and Petrochemical Institute, Iran)

Key Features

- The first textbook in the field of multiscale finite element modeling so far
- The book is written with an applied point of view based on fundamental theories of finite element method which is applicable for students, researchers and engineers
- The multiscale finite element scheme is explained by using many detailed worked examples

Readership: Graduate students, researchers and engineers in the field of mechanical engineering, chemical engineering, material engineering, civil engineering, applied mathematics and physics.

280pp (approx.) Aug 2010
978-1-84816-429-1 US\$65 £49