

---

# Contents

---

## Part I Tutorials

---

### **Multiscale Methods for Subsurface Flow**

*Jørg E. Aarnes, Knut–Andreas Lie, Vegard Kippe, Stein Krogstad* . . . . . 3

### **Multiscale Modelling of Complex Fluids: A Mathematical Initiation**

*Claude Le Bris, Tony Lelièvre* . . . . . 49

### **Fast Algorithms for Boundary Integral Equations**

*Lexing Ying* . . . . . 139

### **Wavelets and Wavelet Based Numerical Homogenization**

*Olof Runborg* . . . . . 195

### **Multiscale Computations for Highly Oscillatory Problems**

*Gil Ariel, Björn Engquist, Heinz-Otto Kreiss, Richard Tsai* . . . . . 237

---

## Part II Projects

---

### **Quantum Mechanics / Classical Mechanics Modeling of Biological Systems**

*Håkan W. Hugosson, Hans Ågren* . . . . . 291

### **Multiple Scales in Solid State Physics**

*Erik Koch, Eva Pavarini* . . . . . 295

### **Climate Sensitivity and Variability Examined in a Global Climate Model**

*Heiner Körnich, Erland Källén* . . . . . 299

### **Coarse-scale Modeling of Flow in Gas-injection Processes for Enhanced Oil Recovery**

*James V. Lambers* . . . . . 303

**Photo-Ionization Dynamics Simulation**

*Garrelt Mellema* ..... 307

**Time Scales in Molecular Reaction Dynamics**

*Yngve Öhrn, Erik Deumens* ..... 311

**Complex Band Structures of Spintronics Materials**

*Peter Zahn, Patrik Thunström, Tomas Johnson* ..... 317



<http://www.springer.com/978-3-540-88856-7>

Multiscale Modeling and Simulation in Science

Engquist, B.; Lötstedt, P.; Runborg, O. (Eds.)

2009, XIV, 320 p., Softcover

ISBN: 978-3-540-88856-7