

Contents

Preface	v
---------------	---

How It All Began: A Personal Account

<i>S. White.</i>	vii
-----------------------------	-----

Part I Introductory Lectures

1 Wilson's Numerical Renormalization Group

<i>T. Costi</i>	3
-----------------------	---

2 The Density Matrix Renormalization Group

<i>R. Noack and S. White.</i>	27
--	----

3 Thermodynamic Limit and Matrix-Product States

<i>S. Rommer and S. Ostlund.</i>	67
---	----

4 A Recurrent Variational Approach

<i>M. Martin-Delgado and G. Sierra.. . . . ,</i>	91
--	----

5 Transfer-Matrix Approach to Classical Systems

<i>T. Nishino, K. Okunishi, Y. Hieida</i> <i>T. Hikihara and H. Takasaki</i>	127
--	-----

6 Quantum Transfer-Matrix and Momentum-Space DMRG

<i>T. Xiang and X. Wang</i>	149
-----------------------------------	-----

7 Calculation of Dynamical Properties

<i>X. Wang, K. Hallberg and F. Naef.</i>	173
---	-----

Part II Physical Applications

1 Chains and Ladders

1.1 Properties of the Hubbard Chain

<i>R. Noack, S. Daul and S. Kneer.</i>	197
---	-----

1.2 Soliton Bound-States in Dimerized Spin Chains

<i>E. Sørensen, I. Affleck, D. Augier and D. Poilblanc</i>	211
---	-----

1.3 Haldane Phase, Impurity Effects and Spin Ladders

<i>X. Wang</i>	221
----------------------	-----

1.4 Spin-Chain Properties

<i>K. Hallberg</i>	231
--------------------------	-----

2 Molecules and Polymers**2.1 Electronic Structure using DMRG**Steven *R. White* 237**2.2 Symmetrized DMRG Method for Conjugated Polymers**S. Rarnasesha and *K. Tandon* 247**2.3 Conjugated One-Dimensional Semiconductors***W. Bar-ford and R. Bursill* 261**2.4 Strongly Correlated Complex Systems**S. Qin, *J. Lou*, Z. Su and *L. Yu* 271**3 Classical Statistical Physics****3.1 Non-Hermitian Problems and Some Other Aspects***I. Peschel and M. Kaulke* 279**3.2 Walls, Wetting and Surface Criticality***E. Carlon* 287**3.3 Critical Two-Dimensional Ising Films with Fields***A. Drzewinski* 295**4 Thermodynamic Properties****4.1 One-Dimensional Kondo Lattices***N. Shibata* 303**4.2 Impurities in Spin Chains***S. Rommer and S. Eggert* 311**4.3 Thermodynamics of Ferrimagnets***U. Schollwöck* 321**4.4 Thermodynamics of Metallic Kondo Lattices***S. Moukouri and L. Caron* 329**5 Phonons and Disorder****5.1 Methods for Electron-Phonon Systems***E. Jeckelmann, C. Zhang and S. White* 337**5.2 Disordered One-Dimensional Fermi Systems***P. Schmitteckert* 345