

Preface

Large scale interacting systems are various kinds of dynamic models, which usually involve random structures in their evolutionary law, and arise in connection with statistical physics or quantum mechanics and also in other broad area of sciences. They are important objects of study in probability theory. This volume is a collection of fifteen research and survey papers concerning these subjects written by speakers of the two international conferences:

1. The Eleventh Mathematical Society of Japan International Research Institute (MSJ-IRI) “Stochastic Analysis on Large Scale Interacting Systems” which was held at the Shonan Village Center, Hayama, Kanagawa Prefecture, Japan from July 17th to 26th, 2002, and
2. “Stochastic Analysis and Statistical Mechanics” which was held at the Yukawa Institute for Theoretical Physics, Kyoto University on July 29th and 30th, 2002 in the framework of the Special Year for Probability Theory: 2002 International Project Research “Stochastic Analysis and Related Topics” run by Research Institute for Mathematical Sciences (RIMS), Kyoto University.

The MSJ-IRI meeting was divided into two parts, workshop and conference. The first part, July 17th-19th, was called workshop and consisted of four expository lecture series delivered by E. Bolthausen of Universität Zürich, S. Kotani of Osaka University, G. Papanicolaou of Stanford University, and S.R.S. Varadhan of New York University. The second part of the meeting, July 22nd-26th, was called conference and consisted of twenty one-hour invited research lectures and thirteen short contributed talks. The meeting in Kyoto was organized consecutively after the MSJ-IRI meeting and consisted of nine one-hour invited lectures. The chairmen of the organizing committees for these two conferences were T. Funaki of the University of Tokyo and H. Osada of Nagoya University, respectively, and serve as editors of the present volume.

The topics which are discussed in this volume cover the hydrodynamic limit, fluctuations, large deviations, spectral gap (Poincaré inequality), logarithmic Sobolev inequality, Ornstein-Zernike asymptotics, random environments, determinantal expressions for systems including exclusion processes (stochastic lattice gas, Kawasaki dynamics), zero range processes, interacting Brownian particles, random walks, self-avoiding walks, Ginzburg-Landau model, interface models, Ising model,