ISSN 1881-6193

RIMS Kôkyûroku Bessatsu B59

Stochastic Analysis on Large Scale Interacting Systems

edited by Ryoki Fukushima, Tadahisa Funaki, Yukio Nagahata,
Makoto Nakashima, Hirofumi Osada and Yoshiki Otobe

July, 2016
Research Institute for Mathematical Sciences
Kyoto University

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Stochastic Analysis on Large Scale Interacting Systems

October 26～29, 2015

edited by Ryoki Fukushima, Tadahisa Funaki, Yukio Nagahata, Makoto Nakashima, Hirofumi Osada and Yoshiki Otobe

July, 2016

Research Institute for Mathematical Sciences

Kyoto University, Kyoto, Japan

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Preface

This volume of RIMS Kôkyûroku Bessatsu is the proceedings of the RIMS workshop "Stochastic Analysis on Large Scale Interacting Systems" (SALSIS) held at Research Institute for Mathematical Sciences, Kyoto University from October 26 to October 29, 2015. The workshop was held in the framework of the RIMS International Project Research 2015 "Stochastic Analysis", which was organized on a special occasion of the centennial anniversary of the birth of Kiyosi Itô. The SALSIS is held continuously every year starting from 2002 at different sites and this was the 14th workshop.

The aim of the workshop was to overview recent progress in stochastic analysis on large scale interacting systems. The workshop program included 34 talks on the problems related to interacting particle systems, the random matrix theory, the KPZ equation, random environments, random walks, the Ising model, percolations, the interface model and others. We had 57 participants during the workshop.

This volume edited by the six organizers listed below is a collection of articles contributed by speakers of the conference. Each paper has been carefully refereed and is in its final form.

We would like to express our gratitude to all speakers, participants and the staff of the RIMS, who contributed to the great success of the workshop. We would also like to express our sincere gratitude to the authors and the referees of the articles of this volume for their excellent jobs in a very tight schedule. Finally, we would like to acknowledge financial supports from the RIMS and JSPS KAKENHI Grant Numbers (A) 24244010, (A) 25247007, (B) 26287014, (B) 26287019 and 26610019.

June 2016

Ryoki Fukushima (Kyoto University)
Tadahisa Funaki (University of Tokyo)
Yukio Nagahata (Niigata University)
Makoto Nakashima (Nagoya University)
Hirofumi Osada (Kyushu University)
Yoshiki Otobe (Shinshu University)

Stochastic Analysis on Large Scale Interacting Systems

Date: 26th October (Mon)-29th October (Thu), 2015
Place: RIMS 420, Kyoto University
Organizers: Ryoki Fukushima (Kyoto University)
Tadahisa Funaki (The University of Tokyo)
Yukio Nagahata (Niigata University)
Makoto Nakashima (University of Tsukuba)
Hirofumi Osada (Kyushu University)
Yoshiki Otobe (Shinshu University)

Timetable

	Oct 26th (Mon)	Oct 27th (Tue)	Oct 28th (Wed)	Oct 29th (Thu)
9:20-10:00	Olla	Deuschel	Katori	Osada
10:10-10:50	Sasamoto	Hariya	Tsai	Gorin
11:10 - 11:50	Sasada	Otobe	Bufetov	Sakagawa
11:50 - 13:30	Lunch			
13:30 - 14:10	Lefevere	Weber	Tanemura	Shirai
14:20 - 15:00	Nagahata	Gubinelli	Duminil-Copin	Croydon
15:20 - 16:00	Nakashima	Abe	Misumi	Esaki
	Takahashi	Okada	Okamura	Kawamoto
16:10 - 16:50	Tsunoda	Nakamura	Nakajima	
	Xu	Tanaka	Kubota	

Program

October 26th (Mon)

9:20-10:00 **Stefano Olla (Université Paris Dauphine)**:
Non-equilibrium macroscopic evolution of chain of oscillators with conservative noise

10:10-10:50 **Tomohiro Sasamoto (Tokyo Institute of Technology)**:
Dualities for asymmetric interacting particle systems

11:10-11:50 **Makiko Sasada (The University of Tokyo)**:
A new technique for the computation of central limit theorem variances for exclusion processes and its application

13:30-14:10 **Raphael Lefevere (Université Paris Diderot)**:
Macroscopic diffusion in random Lorentz gases

14:20-15:00 **Yukio Nagahata (Niigata University)**:
An estimate of spectral gap for surface diffusion

15:20-15:40 **Makoto Nakashima (University of Tsukuba)**:
On phase transition of random walk pinning model

15:40-16:00 **Hiroshi Takahashi (Nihon University)**:
Recurrence and transience of multi-dimensional Brox-type diffusion processes

16:10-16:30 **Kenkichi Tsunoda (The University of Tokyo)**:
Static and dynamic large deviations for a reaction diffusion model

16:30-16:50 **Lu Xu (The University of Tokyo)**:
Central limit theorem for stochastic heat equations in random environments

October 27th (Tue)

9:20-10:00 **Jean-Dominique Deuschel (TU Berlin)**:
Invariance Principle for the Random Conductance Model with dynamic degenerate weights

10:10-10:50 **Yuu Hariya (Tohoku University)**:
On an extension of the Brascamp-Lieb inequality

11:10-11:50 **Yoshiki Otobe (Shinshu University)**:
Inverse Problems for Stochastic Transport Equasions

11:50-13:30 **Lunch**

13:30-14:10 **Hendrik Weber (The University of Warwick)**:
Φ^4 model on large scales

14:20-15:00 **Massimiliano Gubinelli (Universität Bonn)**
Paracontrolled distributions and the KPZ equation.

15:20-15:40 **Yoshihiro Abe (Kyoto University)**:
Extremes of local times for simple random walks on symmetric trees

15:40-16:00 **Izumi Okada (Tokyo Institute of Technology)**:
Geometric structures of favorite points and late points of simple random walk and high points of Gaussian free field in two dimensions

16:10-16:30 **Chikara Nakamura (Kyoto University)**:
Laws of the Iterated Logarithm for Random Walk on the Random Conductance Model

16:30-16:50 **Ryokichi Tanaka (Tohoku University)**:
Random walk on Gromov hyperbolic groups: entropy and speed

October 28th (Wed)

9:20-10:00 **Makoto Katori (Chuo University)**:
Elliptic Bessel Process and Elliptic Dyson Model Realized as Temporally Inhomogeneous Processes

10:10-10:50 **Li-Cheng Tsai (Stanford University)**:
Infinite Dimensional Stochastic Differential Equations for Dyson's Brownian Motion

11:00-11:50 **Alexander I. Bufetov (Aix-Marseille Université)** :
Quasi-Symmetries of Determinantal Point Processes

11:50-13:30 **Lunch**

13:30-14:10 **Hideki Tanemura (Chiba University)**:
Stochastic differential equations related to random matrix theory

14:20-15:00 **Hugo Duminil-Copin (Université de Genève)**:
A geometric approach to the Ising model

15:20-15:40 **Jun Misumi (Kochi university)**:
Estimate on the diameter of a long-range percolation graph on the fractal lattice and its application

15:40-16:00 **Kazuki Okamura (Kyoto University)**:
Enlargement of subgraphs of infinite graphs by Bernoulli percolation

16:10-16:30 **Shuta Nakajima (Kyoto University)**:
Concentration of First Passage Percolation

16:30-16:50 **Naoki Kubota (Nihon university)**:
Concentrations for the simple random walk in unbounded nonnegative potentials

October 29th (Thu)

9:20-10:00 **Hirofumi Osada (Kyushu University)**:
Ginibre interaction Brownian motions are sub-diffusive

10:10-10:50 **Vadim Gorin (MIT)**:

Largest eigenvalues in random matrix beta-ensembles: identification of the limit

11:10-11:50 **Hironobu Sakagawa (Keio University)**:

On the probability that Laplacian interface models stay positive in subcritical dimensions

11:50-13:30 **Lunch**

13:30-14:10 **Tomoyuki Shirai (Kyushu University)**:

On the topology of random simplicial complexes

14:20-15:00 **David Croydon (The University of Warwick)**

Quenched localisation in the Bouchaud trap model with slowly varying traps

15:20-15:40 **Syota Esaki (Tokyo Institute of Technology)**:

Infinite particle systems of long range jumps with long range interactions

15:40-16:00 **Yosuke Kawamoto (Kyushu University)**:

Finite particle approximation of infinite-dimensional SDE related to random matrices

This symposium is supported by

RIMS International Project Research 2015 “Stochastic Analysis”

JSPS Kakenhi, Grant-in-Aid for Scientific Research (A) 24244010 (PI: H. Osada)

JSPS Kakenhi, Grant-in-Aid for Scientific Research (A) 25247007 (PI: T. Kumagai)

JSPS Kakenhi, Grant-in-Aid for Scientific Research (B) 26287014 (PI: T. Funaki)

JSPS Kakenhi, Grant-in-Aid for Scientific Research (B) 26287019 (PI: T. Shirai)

JSPS Kakenhi, Grant-in-Aid for Challenging Exploratory Research 26610019 (PI: T. Funaki)

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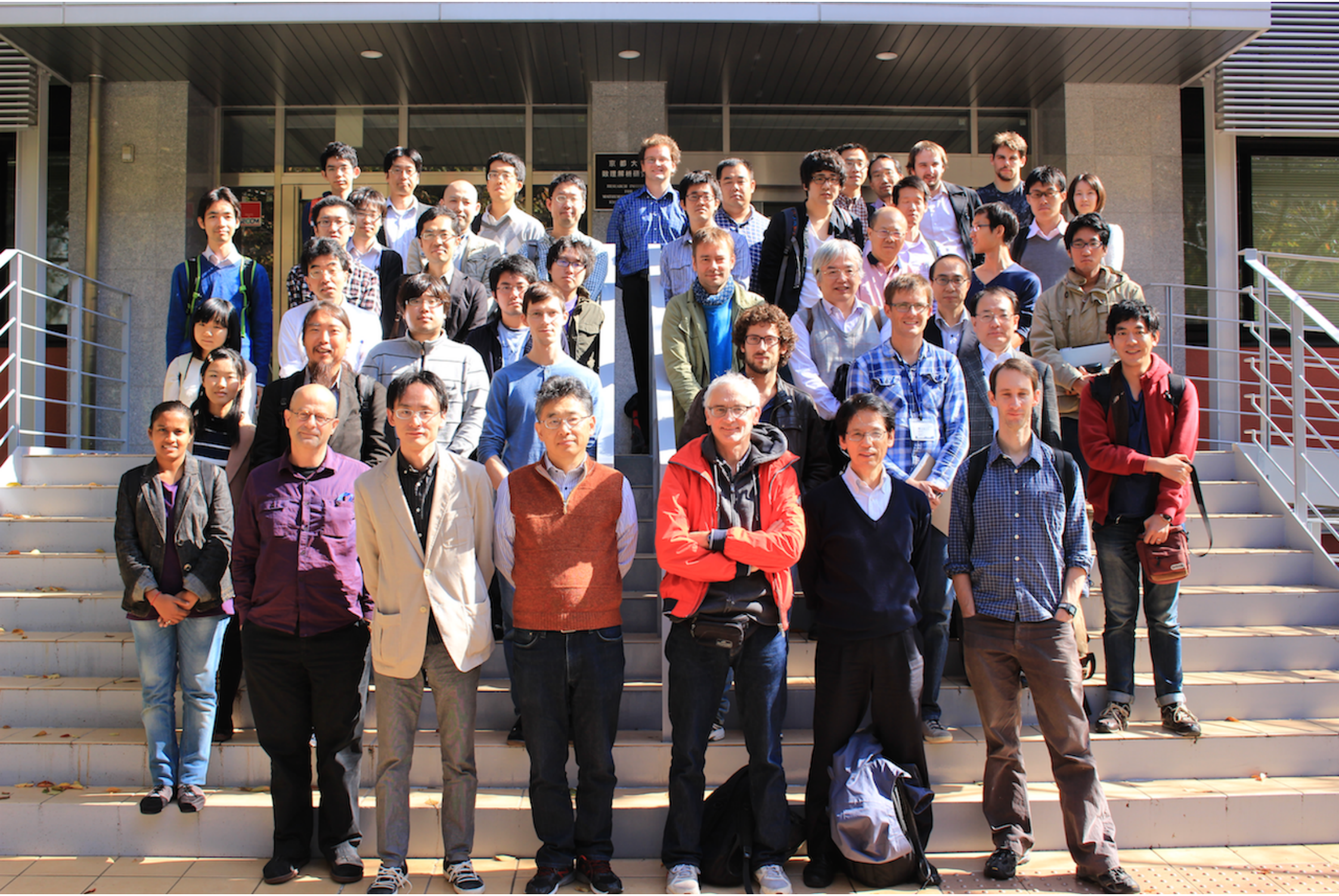
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