ランダム作用素のスペクトルと関連する話題

平成２３年度科研費基盤研究（Ｃ）「定常点過程論の枠組みによるランダム作用素のスペクトル統計の研究」（代表者：慶應義塾大学医学部 南 就将）および平成２３年度科研費基盤研究（Ｃ）「ランダムシュレディンガー作用素のスペクトルの確率論的研究」（代表者：京都大学大学院人間・環境学研究科 上木直昌）による表記の研究集会を下記のように開催します。

日程 平成２３年１２月１日（木）−３日（土）

場所 京都大学 人間・環境学研究科棟 ２階２２６室

世話人：上木 直昌（京都大学大学院人間・環境学研究科）、南 就将（慶應義塾大学医学部）

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プログラム

１２月１日（木）

9:30–10:20 上木 直昌（京都大学大学院 人間・環境学研究科）(N. Ueki, Kyoto Univ.),
　　Wegner estimate for Gaussian random magnetic fields.

10:30–11:20 新國裕昭（同志社大学理工学部）(H. Niikuni, Doshisha Univ.)
　　A periodic Schrödinger operator with two degenerate spectral gaps.

11:30–12:20 南 就将（慶應義塾大学医学部）(N. Minami, Keio Univ.)
　　New proofs of some basic theorems in stationary point process theory.

14:00–14:50 香取 眞理（中央大学理工学部）(M. Katori, Chuo Univ.)
　　Vicious Brownian motion with Toda lattice potential and O'Connell's process.

15:00–15:50 笹本 智弘（千葉大学大学院理学研究科）(T. Sasamoto, Chiba Univ.)
　　The KPZ crossover distributions.

16:10–17:00 永尾 太郎（名古屋大学大学院 多元数理科学研究科）(T. Nagao, Nagoya Univ.)
　　A two-matrix model describing the transition between chiral and non-chiral random matrices.

１２月２日（金）

10:00–10:50 Keith Slevin（大阪大学 理学研究科）(K. Slevin, Osaka Univ.)
　　Critical exponent for the quantum Hall effect.

11:00–11:50 氷上忍（東京大学大学院 総合文化研究科）(S. Hikami, Tokyo Univ.)
　　On an Airy matrix model with a logarithmic potential.

13:30–14:20 福島竜輝（東京工業大学 理工学研究科）(R. Fukushima, Tokyo Inst. Tech.)
　　Localization for annealed Brownian motion in a heavy tailed Poisson potential.

14:40–15:30 （関西確率論セミナーとの共催講演）

    Roman Kotecky (University of Warwick)

    A nontrivial structure of the set of all proper colourings on a lattice.

15:40–16:30 （関西確率論セミナーとの共催講演）

    Marek Biskup (UCLA)

    A CLT without local CLT in random conductance models with heavy lower tails.

16:40–17:30 （関西確率論セミナーとの共催講演）

    Claudio Landim (IMPA)

    A thermodynamic theory for nonequilibrium systems.

１２月３日（土）

9:30–10:20 中野 史彦（学習院大学理学部）(F. Nakano, Gakushuin Univ.)

    １次元ランダムシュレーディンガー作用素の準位統計について（ac-case）.

10:30–11:20 中村　周（東京大学数理科学研究科）(S. Nakamura, Tokyo Univ.)

    Remarks on the spectral shift function and the Friedel sum rule.

    (joint work with M. Kohmoto and T. Koma)

11:30–12:20 神永 正博（東北学院大学工学部）(M. Kaminaga, Tohoku-Gakuin Univ.)

    The spectrum of 2D Schrödinger operators with Poisson random potentials.

14:00–14:50 峯　拓矢（京都工芸繊維大学 工芸科学研究科）(T. Mine, Kyoto Inst. Tech.)

    ２次元における Bethe-Sommerfeld 予想について

2011 年 11 月 29 日現在

Critical exponent for the quantum Hall transition

Keith Slevin, Osaka University
Tomi Ohtsuki, Sophia University

The plateau transition in the integer quantum Hall effect has been studied extensively during the last three decades both experimentally and theoretically. A few years ago, we pointed out [1] that the critical exponent for the divergence of the localization length is 2.59+-0.01, significantly higher than the oft-quoted value 2.37[2]. This result has now been confirmed by other authors[3, 4]. In this contribution, we will report our latest unpublished results on the finite size scaling analysis of the Chalker-Coddington model and discuss to what extent the observed scaling is consistent with the predictions of Lutken and Ross [5].

[1]   K. Slevin, and T. Ohtsuki, Phys. Rev. B **80**, 041304(R) (2009).
[2]   B. Huckestein, Rev. Mod. Phys. **67**, 357 (1995).
[3]   M. Amado *et al.*, Phys. Rev. Lett. **107**, 066402 (2011).
[4]   J. P. Dahlhaus *et al.*, Phys. Rev. B **84**, 115133 (2011).
[5]   C. A. Lutken, and G. G. Ross, Physics Letters B **653**, 363 (2007).

A nontrivial structure of the set of all proper colouring on a lattice.

Roman Kotecky, University of Warwick

A possibility of a non-trivial structure arising in the uniform distribution on the set of all proper colourings of a regular lattice has been an intriguing conjecture for quite a long time.
Recently it was shown that this is the case for 3-colourings on a particular class of lattices lattice (diced lattice).
The main idea is based upon an evaluation of the probability of events with distinct coexisting patterns linked with a necessity of passing over appropriately defined "entropic barriers".

Based on joint papers with J. Salas and A. Sokal and J. Swart.

A thermodynamical theory for nonequilibrium systems.
Claudio Landim, IMPA

We present "physical theory" for a certain class of thermodynamic systems out of equilibrium, which is founded on and supported by the analysis of a large family of stochastic microscopic models.

A CLT without local CLT in random conductance models with heavy lower tails
Marek Biskup, UCLA

I will describe recent progress in the understanding of anomalous (subdiffusive) behavior of the return probabilities for the random walk among i.i.d. random conductances that are bounded but have heavy tails at zero. The occurrence of subdiffusive decay is quite surprising given the fact that the path distribution of the walk obeys a non-degenerate functional CLT in all cases of interest. The subdiffusive behavior arises from trapping: Instead of finding the starting point randomly (the diffusive strategy) the walk might prefer to hide in a nearby trap for a majority of its time and thus ease its passage back (the trapping strategy) Recently, it was understood that the two stated strategies are dominant among all others. Based on a joint paper with N. Berger, C. Hoffman, G. Kozma and recent preprints with O. Boukhadra and with O. Louidor, A. Rozinov and A. Vandenberg-Rodes.