ランダム作用素のスペクトルと関連する話題

第 1 部（RIMS 研究集会）

- 平成 27 年 1 月 8 日（木）－ 9 日（金）
- 京都大学数理解析研究所 111 号室

第 2 部（自主開催）

- 平成 27 年 1 月 10 日（土）
- 京都大学人間・環境学研究科棟 226 号室

世話人：上木直昌（京都大学）
中野史彦（学習院大学）
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プログラム

第 1 部
1 月 8 日（木）

9:00-9:10 世話人挨拶

9:10-9:50 中野史彦（学習院大学）
1 次元ランダムシュレーディンガー作用素のポアソン収束定理について

10:00–10:40 福島竜輝（京都大学）
Anderson 模型の固有値の homogenization と揺らぎについて

11:00–11:40 Andrei Giniatoulline (Los Andes University)
On the spectral properties of operators describing normal oscillations in 3-dimensional rotating stratified fluid

11:30–13:30 昼休み

13:30–14:10 Qinghui Liu (Beijing Institute of Technology)
On the Hausdorff dimension of the spectrum of Thue-Morse Hamiltonian

14:20–15:00 Yanghui Qu (Tsinghua University)
The spectral properties of strongly coupled Sturm Hamiltonian of constant type

15:20–16:00 小谷眞一（関西学院大学）
Transformations of Herglotz functions and KdV equation

16:10–16:50 峯拓矢（京都工芸繊維大学）
On the Schrödinger operators with random δ magnetic fields

1 月 9 日（金）

9:10–9:50 大槻東巳（上智大学）
Density of states and conductance in topological insulator nanofilms

10:00–10:40 上岡良季（大阪大学）
Critical exponent of the localization length for the Anderson transition and corresponding methods

11:00–11:40 高麗徹（学習院大学）
Topological current in fractional Chern insulators

11:40–13:30 昼休み

13:30–14:10 笹本智弘（東京工業大学）
Analysis of the q-Hahn stochastic processes

14:20–15:00 香取眞理（中央大学）
Elliptic determinant evaluations and diffusion processes

15:20–16:00 Sergio Andraus（東京大学）
Relaxation of interacting particle systems using Dunkl operators

16:10–16:50 今村卓史（千葉大学）
The O'Connell-Yor directed polymer and a deformed GUE weight

第 2 部
1 月 10 日（土）

9:10–9:50 上木直昌（京都大学）
Anderson localization in Gausian random magnetic fields

10:00–10:40 南就将（慶應義塾大学）
On a class of generalized Sturm-Liouville operators

10:50–11:30 討論

2014 年 12 月 3 日

Abstracts

On the spectral properties of operators describing normal oscillations in 3-dimensional rotating stratified fluid (A. Giniatoulline)

We find the structure and localization of the essential spectrum and discrete spectrum of the operators generated by systems modeling the dynamics of rotating stratified fluid. For viscous fluid, the essential spectrum consists of three real points, which move to infinity if the viscosity parameter tends to zero.

However, for the inviscid fluid the essential spectrum contains the interval of the imaginary axis. We also mention the background and the motivation of the problem, as well as the conclusions, from the physical point of view.

Critical exponent of the localization length for the Anderson transition and corresponding methods (Y. Ueoka)

The Anderson transition is a quantum phase transition induced by the strength of disorder. Similarly to other continuous phase transitions, critical phenomena of the Anderson transition have been studied with scaling theory and renormalization group methods. One of the most important hypothesis in this field is universality. For the critical exponents describing behavior of physical quantity near the transition, it is believed to depend only on the fundamental properties of the system such as dimensionality and symmetry. Critical exponents has been estimated numerically, theoretically, and experimentally. But, the critical exponent for the localization length ν estimated numerically in Anderson model differ from theoretical estimates. In field theoretical approach, critical exponent as a function of the dimensionality was calculated to finite order as perturbation from two dimension. The value of the critical exponent was estimated by approximate resummation method so called Borel-Pad analysis about twenty years ago. We have improved Borel-Pad analysis to incorporate asymptotic behavior at infinite dimension for same series. It gives much better estimation compared with numerical result for the Anderson model. I will talk about further improvement of this method for other symmetry, especially the systems including spin-orbit coupling. I may show some numerical study for such system if possible.

References [1] Y. Ueoka, K. Slevin: J. Phys. Soc. Jpn. 83, 084711 (2014) [2] S. Hikami: Prog. Theor. Phys. Suppl. 107, 213 (1992) [3] F. Evers, A. D. Mirlin: Rev. Mod. Phys. 80, 1355 (2008)