
## 8th Sendai Workshop

# Infinite Dimensional Analysis and Quantum Probability

**November 10 - 12, 2008**
**Graduate School of Information Sciences**
**Tohoku University**

# PROGRAM

## November 10 (Mon)  GSIS, Large Lecture Hall (2F)

14:00-14:50 Marek Bożejko (University of Wrocław)
*Generalized Brownian motions and positive definite functions on Coxeter groups*

15:00-15:30 Kimiaki Saitô (Meijo University)
*Exotic Laplacians and exponential functions of white noise*

15:30-16:00 Masatoshi Hamada (Yokohama National University)
*Orthogonal polynomials induced by quantum walks*

16:10-16:40 Akihito Hora (Nagoya University)
*Kerov CLT for a non-Plancherel ergodic measure*

16:40-17:30 Takeshi Hirai (Kyoto University)
*On spin characters of finite and infinite complex reflection groups G(m,p,n) and G(m,p,∞)*

18:30- Party

## November 11 (Tue)  Aoba Memorial Hall, Room 702

10:00-10:50 Un Cig Ji (Chungbuk National University)
*Generalized Fourier-Gauss transformations and Bogoliubov transformations*

11:00-11:30 Toshihico Arimitsu (Tsukuba University)
*Non-Equilibrium Thermo Field Dynamics and its application to error-correction for spatially correlated quantum errors*

11:30-12:00 Fumio Hiroshima (Kyushu University)
*Spectral analysis by path measures in QFT*

12:00-13:30 Lunch

13:30-14:00 Hyun Jae Yoo (Hankyong National University)
*Glauber and Kawasaki dynamics for determinantal point processes*

14:00-14:30 Etsuo Segawa (Yokohama National University)
*Limit theorems for quantum walks with multi coins*

14:30-15:00 Seung Jun Chang (Dankook University)
*Transforms and convolutions on function space*

15:00-15:30 Yusuke Ide (Yokohama National University)
*Limit theorems for statistics of the threshold network model*

15:40-16:30 Wojciech Młotkowski (University of Wrocław)
*Fuss-Catalan numbers in noncommutative probability*

## November 12 (Wed) Aoba Memorial Hall, Room 401

10:00-10:50 Norio Konno (Yokohama National University)
*Limit theorems for discrete-time quantum walks on trees*

11:00-11:30 Uwe Franz (Universite de Franche-Comte)
*Meixner classes in quantum probability*

11:30-12:00 Kun Sik Ryu (Hannam University)
*Integration with respect to analogue of Wiener measure over paths in abstract Wiener space and its applications*

12:00-13:30 Lunch

13:30-14:00 Jaeseong Heo (Hanyang University)
*On amenable action and co-amenability of the Thompson group*

14:00-14:30 Taku Matsui (Kyushu University)
*Split property and entanglement*

14:40-15:10 Hiroaki Yoshida (Ochanomizu University)
*Meixner operators on the q-Fock space and Schrödinger algebra*

15:10-16:00 Janusz Wysoczański (University of Wrocław)
*Remarks on bm-independence*

# ABSTRACTS

**Arimitsu, Toshihico (Tsukuba University)**
tarimtsu@sakura.cc.tsukuba.ac.jp

***Non-Equilibrium Thermo Field Dynamics and its application to error-correction for spatially correlated quantum errors (in collaboration with T. Hayashi, S. Kitajima and F. Shibata)***

By means of the canonical operator formalism for dissipative quantum systems, named Non-Equilibrium Thermo Field Dynamics, it is shown that errors due to spatially correlated noises can be corrected by the correction code prepared for spatially independent noises, with the help of a model of noisy-channel under the influence of spatially correlated quantum Brownian motion.

**Bożejko, Marek (University of Wrocław)**
bozejko@math.uni.wroc.pl

***Generalized Brownian motions and positive definite functions on Coxeter groups***

We will show a new class of Brownian motions coming from generalized Thoma characters on permutation (Coxeter) groups. Connections with the results of Hirai, Hora and Bryc will be also done.

**Chang, Seung Jun (Dankook University)**
sejchang@dankook.ac.kr

***Transforms and convolutions on function space***

In this talk, for functionals of a generalized Brownian motion process, we show that the generalized Fourier-Feynman transform of the convolution product is a product of mutiple transforms. This allows us to compute the transform of the convolution product without computing the convolution product.

**Franz, Uwe (Universite de Franche-Comte)**
ufranz@univ-fcomte.fr

***Meixner classes in quantum probability***

We use the quadratic regression property to characterise the analog of the Meixner classes for monotone and boolean independence, and discuss their relations (including also the free case).

**Hamada, Masatoshi (Yokohama National University)**
mhamada@npde.osu.sci.ynu.ac.jp
***Orthogonal polynomials induced by quantum walks***
We study a class of orthogonal polynomials given by the limit density of the discrete-time quantum walk in one dimension.

**Heo, Jaeseong (Hanyang University)**
hjs@hanyang.ac.kr
***On amenable action and co-amenability of the Thompson group***
In this talk we will consider an action of the Thompson group for co-amenability. We will also discuss the amenability problem of the Thompson group.

**Hirai, Takeshi (Professor Emeritus, Kyoto University)**
hirai.takeshi@math.mbox.media.kyoto-u.ac.jp
***On spin characters of finite and infinite complex reflection groups G(m,p,n) and G(m,p,∞)***
We discuss on spin charaters and also on projective representations of these groups.

**Hiroshima, Fumio (Kyushu University)**
hiroshima@math.kyushu-u.ac.jp
***Spectral analysis by path measures in QFT***
Functional integrations are applied to spectral analysis in quantum field theory.

**Hora, Akihito (Nagoya University)**
hora@math.nagoya-u.ac.jp
***Kerov CLT for a non-Plancherel ergodic measure***
We shall discuss CLT of Kerov's type for a non-Plancherel ergodic measure associated with a character of the infinite symmetric group by way of the method of quantum probability.

**Ide, Yusuke (Yokohama National University)**
ide@math.sci.ynu.ac.jp
***Limit theorems for statistics of the threshold network model***
We give the asymptotic behavior of degree, clustering coefficient and average distance.

**Ji, Un Cig (Chungbuk National University)**
uncigji@chungbuk.ac.kr

***Generalized Fourier-Gauss transformations and Bogoliubov transformations***

We study the generalized Fourier-Gauss transformations and Bogoliubov transformations which are represented as compositions of generalized Fourier-Gauss transform and Fourier-Mehler transform.

**Konno, Norio (Yokohama National University)**
konno@ynu.ac.jp

***Limit theorems for discrete-time quantum walks on trees***

We present some limit theorems for discrete-time quantum walks on trees and discuss a relation between discrete-time and continuous-time ones.

**Matsui, Taku (Kyushu University)**
matsui@math.kyushu-u.ac.jp

***Split property and entanglement***

We explain recent results on distillation of infinitely many maximally entangled pair of q-bits in infinite quantum systems. This is a joint work with M. Keyl, D. Schlingemann, R. Werner.

**Młotkowski, Wojciech (University of Wrocław)**
Wojciech.Mlotkowski@math.uni.wroc.pl

***Fuss-Catalan numbers in noncommutative probability***

We prove that if $p \geq 1$ and $0 \leq r \leq p$ then the Fuss-Catalan sequence $\frac{r}{mp+r}\binom{mp+r}{m}$ is positive definite. We study the family of the corresponding probability measures from the point of view of noncommutative probability.

**Ryu, Kun Sik (Hannam University)**
ksr@hnu.kr

***Integration with respect to analogue of Wiener measure over paths in abstract Wiener space and its applications***

In 1992, the author introduced the definition and the properties of Wiener measure over paths in abstract Wiener space and this measure was investigated extensively by some mathematicians. In 2002, the author and Dr. Im presented an article for analogue of Wiener measure and its applications which is the generalized theory of concrete Wiener

measure theory. In this note, we will derive the analogue of Wiener measure over paths in abstract Wiener space and establish two integration formulae, one is similar to the Wiener integration formula and another is similar to simple formula for conditional Wiener integral. Furthermore, we will give some examples for our formulae.

**Saitô, Kimiaki (Meijo University)**
ksaito@ccmfs.meijo-u.ac.jp

***Exotic Laplacians and exponential functions of white noise***

In this talk we discuss infinite dimensional stochastic processes associated with exotic Laplacians based on orthonormal bases for Hilbert spaces with the higher order Cesàro norms and give a relationship between the stochastic processes and infinite dimensional O-U processes introducing an operator changing the white noise by the exponential of white noise.

**Segawa, Etsuo (Yokohama National University)**
segawa820@npde.osu.sci.ynu.ac.jp

***Limit theorems for quantum walks with multi coins***

We show a crossover from the quantum walk to the classical random walk.

**Wysoczański, Janusz (University of Wrocław)**
jwys@math.uni.wroc.pl

***Remarks on bm-independence***

We present the general framework for the notion of bm-independence, along with the analogues of some classical limit theorems.

**Yoo, Hyun Jae (Hankyong National University)**
yoohj@hknu.ac.kr

***Glauber and Kawasaki dynamics for determinantal point processes***

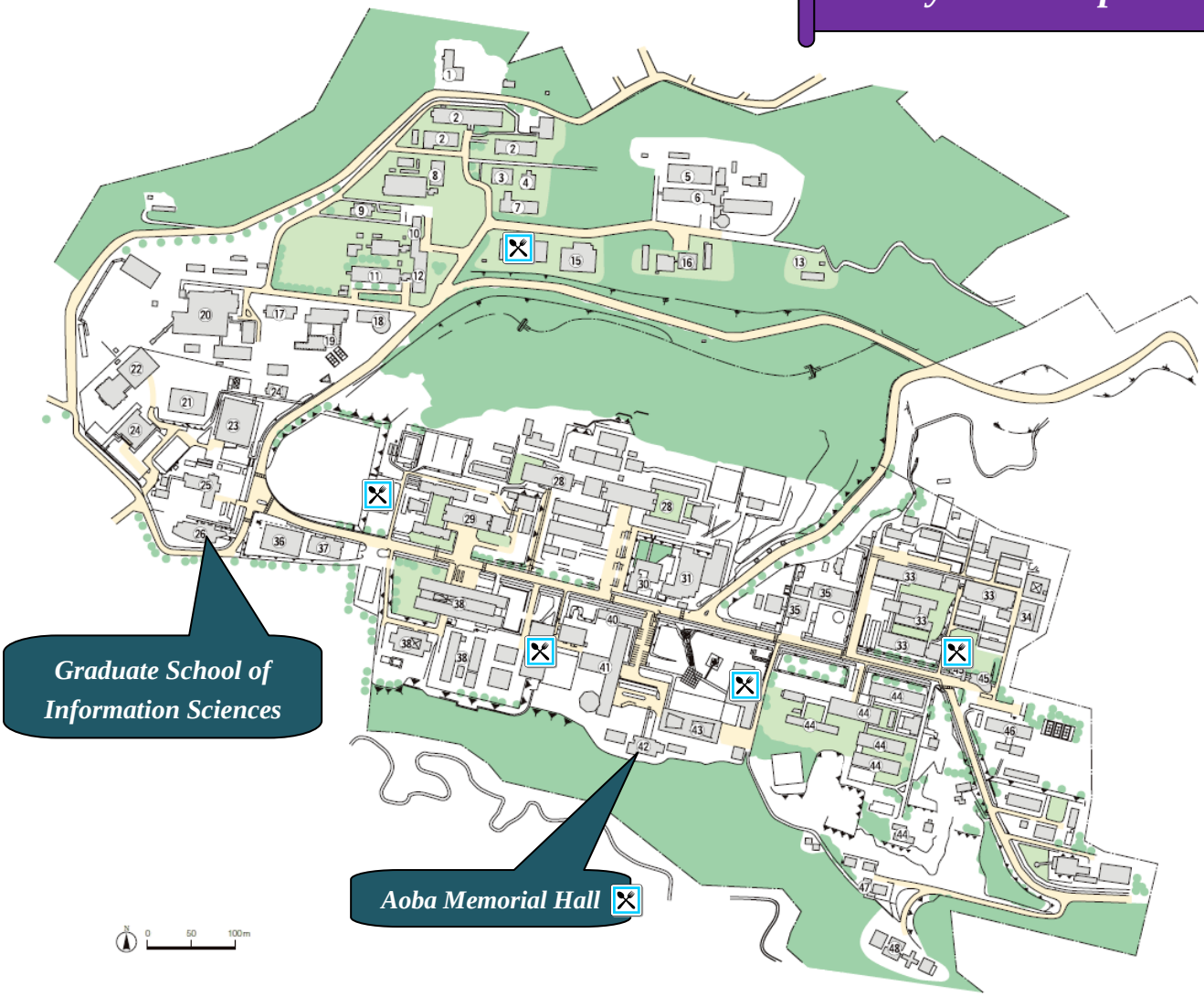
We discuss Glauber and Kawasaki dynamics that leave certain determinantal point processes invariant.

**Yoshida, Hiroaki (Ochanomizu University)**
yoshida@edu.is.ocha.ac.jp

***Meixner operators on the q-Fock space and Schrödinger algebra***

On the q-Fock space, we give the q-Meixner random variables, the Boson case of which is related to the Schrödinger algebra.


## *Aobayama Campus Map*




### *Organizing Committee*

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