New perspectives in asymptotic representation theory

Monday 23 August 2021 - Wednesday 25 August 2021

Online

Scientific Programme

[zoom channel 933-433-492, password=the order of Symmetric group S_6]

23 Aug
10:00-10:40 A. M. Vershik. К 75-летию С.В.Керова (1946-2000) и 50-летию Асимптотической Теории Представлений (АТП -- начало 70-х гг.)
11:00-11:40 F. Petrov. Maxwell--Poincare lemma for Stiefel manifold, and Wishart measures
12:00-12:40 Yu. A. Neretin. Groups of infinite matrices over finite fields

14:00-14:40 I. Pak. Hook formulas and their generalizations
15:00-15:40 N. Reshetikhin. On tensor powers of representations of quantum groups at roots of unity

24 Aug
10:00-10:40 L. Petrov. Free fermion six vertex model and symmetric rational functions
11:00-11:40 N. Tsilevich. The Schur–Weyl graph and Thoma’s theorem

14:00-14:40 G. Koshevoy. Schur positivity and cluster mutations
15:00-15:40 V. Kaimanovich. Coincidence, equivalence and singularity of harmonic measures
16:00-16:40 A. Knizel. Stationary measure for the open KPZ equation

17:00 - memorial session

25 Aug
10:00-10:40 A. Nazarov. Skew Howe duality and limit shape of Young diagrams
11:00-11:40 V. Evtushevsky. Ergodicity of Kerov--Goodman measures on Young--Fibonacci graph
12:00-12:40 A. Malyutin. Growth in groups and the number of knots

Abstracts

I. Pak
Starting with the classical hook-length formula (HLF), I will give a broad overview of the many hook formulas across the literature. I will then discuss our latest beta-deformation of the HLF, which arises from the study of factorial Grothendieck polynomials. The talk will be completely combinatorial and assumes no prior knowledge of the area. Joint work with Alejandro Morales and Greta Panova.

L. Petrov
I'll talk about a new generalization of Schur polynomials and related determinantal measures on domino tilings. These constructions arise from the free fermion six vertex model. The domino weights in the model depend on 4 families of inhomogeneity parameters. We discuss a bulk limit which leads to a new inhomogeneous kernel generalizing the discrete sine kernel. Based on a joint work with Amol Aggarwal, Alexei Borodin, and Michael Wheeler.
Я расскажу об обобщении многочленов Шура и детерминантных мер на замощениях доминошками, которые получаются из свободно-фермионной шестивершинной модели. Получающаяся модель замощений доминошками содержит 4 семейства неоднородных параметров. Мы описываем предел "в гуще", который приводит к новым детерминантным ядрам типа двумерного дискретного синус-ядра. Совместная работа с А.Аггарвалом, А.Бородиным, и М.Уилером.

A. Knizel
The Kardar-Parisi-Zhang (KPZ) equation is the stochastic partial differential equation that models stochastic interface growth. In the talk I will present the construction of a stationary measure for the KPZ equation on a bounded interval with general inhomogeneous Neumann boundary conditions. Along the way, we will encounter classical orthogonal polynomials, the asymmetric simple exclusion process, and precise asymptotics of q-Gamma functions. This is a joint work with Ivan Corwin.

N. Tsilevich
We introduce a graded graph, called the Schur–Weyl graph, which is a covering of the Young graph closely related to the RSK algorithm. Then we explain how it allows one to obtain a new, purely combinatorial, proof of Thoma's theorem, which describes the indecomposable characters of the infinite symmetric group, in the discrete case.
Based on joint work with A.M.Vershik.

V. Kaimanovich
In the absence of measures fully invariant with respect to a group action, this role can be to a certain extent played by the measures "invariant on average", with respect to a certain fixed distribution on the group. These measures are called stationary, and they naturally arise as harmonic measures of random walks. I will provide several partial answers to the general question about the dependence of stationary measures on the underlying step distributions on the group. The talk is based on joint work with Behrang Forghani.

A. Nazarov
We consider skew Howe duality that is related to the action of a pair of Lie groups on the exterior algebra $\bigwedge(\mathbb{C}^{n}\otimes\mathbb{C}^{k})$. This exterior algebra admits a multiplicity-free decomposition into a direct sum of tensor products of representations for the pairs of dual groups (GL_{n},GL_{k}), (SO_{n},Pin_{k}) and (Sp_{n},Sp_{k}). From the point of view of a single group in a pair this is a tensor power decomposition into the sum of the irreducible representations. Such a decomposition can be used to introduce a probability measure on Young diagrams parameterizing the representations that appear in the sum. In the limit of infinite rank of the groups the diagrams converge to a limit shape. In order to derive the limit shape we need to express the dimension of the dual group representation in terms of the original diagram and thus obtain the explicit formula for the multiplicities of tensor power decomposition into the sum of the irreducibles. We connect this multiplicity to the number of paths in the lozenge tiling of a certain hexagonal domain and use the Lindström–Gessel–Viennot lemma, as well as a recursion of the determinants to prove the product formulas for the multiplicities. These paths are naturally connected to the crystals for the corresponding representations. We then compute the asymptotic of the probability measure and derive the explicit formula for the limit shapes of Young diagrams, that is different from the results of A.M. Vershik, S.V. Kerov and P. Biane. We discover that the limit shapes of Young diagrams for the symplectic and orthogonal groups are ``halves'' of the limit shape of the general linear group.