EOS
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Third EOS PRIMA Annual Meeting

September 17, 2020

Online meeting – Ghent University

10:00 – 11:00	**Erik Koelink** (Radboud Universiteit, Nijmegen) *Nonabelian Toda lattice and matrix valued polynomials*
11:00 – 11:30	Coffee break
11:30 – 12:00	**Alexandre Lazarescu** (UCLouvain) *Infinite-dimensional R-matrix methods for U_q(sl_2)*
12:00 – 14:00	Lunch
14:00 – 14:30	**Asmus Bisbo** (UGent) *Realizations of representations of orthosymplectic algebras*
14:30 – 15:00	**Gabriel Glesner** (UCLouvain) *Asymptotics for averages over classical orthogonal ensembles*
15:00 – 15:30	**Dan Betea** (KULeuven) *An exploration of directed last passage percolation results*

fnrs FREEDOM TO RESEARCH
UCLouvain
KU LEUVEN
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fwo Opening new horizons

Erik Koelink – Nonabelian Toda lattice and matrix valued polynomials

The classical Toda lattice is a model for a one-dimensional crystal. After a transformation in coordinates there is a Lax pair, for which the operator acts as a three-term recurrence operator. This gives a link to orthogonal polynomials, and the time dependence in the Toda lattice corresponds to a deformation of the orthogonality measure by an exponential. The nonabelian Toda lattice is a generalisation of the Toda lattice for which matrix valued orthogonal polynomials play a similar role. We discuss matrix valued polynomials in some detail, and some explicit examples of the nonabelian Toda lattice.

Alexandre Lazarescu – Infinite-dimensional R-matrix methods for U_q(sl_2)

The R-matrix, which intertwines two copies of a quantum group, is the basic building block of many integrable systems. In this short talk, I will be looking at the quantum group U_q(sl_2), and the physical models that can be built around it: the six vertex model (2D statistical lattice model), the asymmetric simple exclusion process (1D classical stochastic transport model), and the XXZ spin chain (1D quantum spin chain). I will present a range of tools and operations involving the R-matrix, which make it easier to solve those models. Starting from the standard spin-1/2 integrable transfer matrix T, I will show how a fusion limit towards infinite spin allows to construct the so-called Q-operator and obtain the T-Q equations that are crucial in solving our models. I will then show how we can directly construct a more general Q-operator using infinite "complex spin" representations of U_q(sl_2), which allows for a more compact derivation of those same equations. If time allows, I will show how this construction makes it possible to treat open models with generic boundary conditions.

Asmus Bisbo – Realizations of representations of orthosymplectic algebras

The orthosymplectic Lie superalgebra osp(2m+1|2n) can be realized as the algebra generated by n p-dimensional Dirac operators and vector variables on Cartesian coordinates and m p-dimensional Dirac operators and vector variables on Grassmannian coordinates. We show how this leads to a realization of the irreducible representation of lowest weight (-p/2,…,-p/2;p/2,…,p/2) and how to construct an explicit basis for this representation in the cases osp(1|2n) and osp(2m+1|0)=so(2m+1). This is joint work with Hendrik De Bie and Joris Van der Jeugt.

Gabriel Glesner – Asymptotics for averages over classical orthogonal ensembles

We study averages of multiplicative eigenvalue statistics in ensembles of orthogonal Haar distributed matrices and obtain new asymptotics for symbols with Fisher-Hartwig singularities, and for symbols with a gap or an emerging gap. We obtain these asymptotics by relying on results for Toeplitz determinants and on asymptotics for associated orthogonal polynomials on the unit circle. As consequences of our results, we derive asymptotics for several probabilistic quantities.

Dan Betea – An exploration of directed last passage percolation results

Abstract: We explore a few results in directed last passage percolation, starting from the classical Baik-Deift-Johansson theorem on longest increasing subsequences of random permutations and continuing with more recent work by the author and his collaborators on similar ideas. Our focus is analytic and probabilistic but whenever possible we try to hint at the representation theory, mathematical physics, and combinatorics behind such results. Scaling theory of last passage times for the (mostly integrable) models of interest often mirrors edge scaling of the spectra of random matrices. Other times there are surprises and laws of extrema of iid random variables appear naturally.

Topic: EOS-17sep-morning

Time: Sep 17, 2020 10:00 AM Brussels

Join Zoom Meeting

https://zoom.us/j/92651796831?pwd=MVp3Rk5BNDdLVXRCdGZtRUJJNStTUT09

Meeting ID: 926 5179 6831

Passcode: 744578

Topic: EOS-17sep-afternoon

Time: Sep 17, 2020 02:00 PM Brussels

Join Zoom Meeting

https://zoom.us/j/96502611372?pwd=NFBmN21LeVROaHVFcGVrYXlyU2FXdz09

Meeting ID: 965 0261 1372

Passcode: 063390