De: **CRM** crm@crm.umontreal.ca
Objet: COLLOQUE DES SCIENCES MATHÉMATIQUES DU QUÉBEC (23/10/2015, John Harnad)
Date: 19 octobre 2015 10:21
À: activites@CRM.UMontreal.CA

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COLLOQUE DES SCIENCES MATHÉMATIQUES DU QUÉBEC - Montréal
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DATE :
Le vendredi 23 octobre 2015 / Friday, October 23, 2015

HEURE / TIME :
16 h / 4:00 p.m.

CONFERENCIER(S) / SPEAKER(S) :
John Harnad (Concordia University et CRM)

TITRE / TITLE :
Weighted Hurwitz Numbers: Classical and Quantum

LIEU / PLACE :
UQAM, Pavillon Sherbrooke, Salle SH-2420

RESUME / ABSTRACT :
Hurwitz numbers enumerate branched coverings of the Riemann sphere. An equivalent combinatorial problem consists of enumeration of factorizations of elements of the symmetric group. The study of these enumerative invariants is classical, dating back to the pioneering work of Hurwitz, Frobenius and Schur. In 2000, Okounkov and Pandharipande began their program relating Hurwitz numbers to other combinatorial/topological invariants associated to Riemann surfaces, such as Gromov-Witten and Donaldson-Thomas invariants. A key result was the expression generating functions for Hurwitz numbers of branched covers with only simple branching, plus one, or two other branch points, as Tau functions of of the KP and Toda hierarchies, using the associated semi-infinite wedge product representation.

In recent work, these ideas were extended to generating functions for a very wide class of weighted branched coverings, making use of the six standard bases for the ring of symmetric functions, such as Schur functions, and monomomial sum symmetric and also their “quantum” deformations, involving the Macdonald polynomials.

The general theory of weighted Hurwitz numbers, together with various applications and examples coming from Random Matrix theory and enumerative geometry will be explained in a simple, unified way, using bases for the center of the symmetric group algebra, the characteristic map to the ring of symmetric polynomials. and multiplicatively defined symmetric functions evaluated on the Jucys-Murphy elements of the group algebra.

The simplest quantum case gives a special weighted enumeration of branched coverings that is closely related to the statistical mechanics of Bose-Einstein gases with linear energy spectrum.

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