

De: CRM CRM@CRM.UMontreal.CA

Objet: CHAIRE AISENSTADT CHAIR 2015 - Bertrand Eynard (CPT, CEA Saclay) - SÉRIE DE CONFÉRENCES & MINI-COURS

Date: 22 septembre 2015 15:49

À: activites@crm.umontreal.ca



CHAIRE AISENSTADT CHAIR 2015
Centre de recherches mathématiques
Série de conférences et mini-cours / Series of lectures and Mini-courses

Semestre thématique du CRM
Correspondance AdS/CFT, holographie, intégrabilité

CRM Thematic Semester
AdS/CFT, Holography, Integrability

Bertrand Eynard (CPT, CEA Saclay)

SÉRIE DE CONFÉRENCES / SERIES OF LECTURES

"Topological Recursion"

Topological recursion is an ubiquitous and universal recursive relationship that has appeared in various domains of mathematics and physics: volumes of moduli spaces, coefficients of asymptotic expansions in random matrix theory, Hurwitz numbers, Jones polynomials, Gromov-Witten invariants, and many other combinatorial objects, all mysteriously satisfy the same relation. Moreover, this recursion relation is effective: it allows an actual computation. This recursion has been axiomatized into a definition of some "new invariants" of curves. In this lecture we shall introduce the topological recursion, illustrate it on examples and mention its beautiful properties.

Vendredi 2 octobre 2015 / Friday, October 2, 2015
(Conférence s'adressant à un large auditoire / Suitable for a general audience)

Centre de recherches mathématiques
Pavillon André-Aisenstadt
Université de Montréal
Salle / Room 6254
16h00 / 4:00 pm

Une réception suivra la conférence au Salon Maurice-L'Abbé, Pavillon André-Aisenstadt (Salle 6245)

A reception will follow at the Salon Maurice-L'Abbé, Pavillon André-Aisenstadt (Room 6245).

"Introduction to CFT amplitudes and Hitchin systems"

Building amplitudes from a Hitchin system. Recently it has been observed that there is a relationship between CFT conformal blocks and tau functions of integrable systems. The best known example is Liouville theory 4-point function related to Painlevé VI Tau function. We propose a systematic construction of CFT amplitudes from an arbitrary Hitchin system. This introduces a fascinating geometry.

Vendredi 9 octobre 2015 / Friday, October 9, 2015
(Conférence s'adressant à un large auditoire / Suitable for a general audience)

Centre de recherches mathématiques
Pavillon André-Aisenstadt
Université de Montréal
Salle / Room 5340
14h00 / 2:00 pm

"CFT amplitudes and Hitchin systems"

Checking that the amplitudes satisfy the CFT axioms: OPEs, Ward identities. Modular invariance and the crossing symmetry, from the geometry of Higgs bundles.

Vendredi 23 octobre 2015 / Friday, October 23, 2015
(Conférence s'adressant à un public averti / Suitable for a more technical audience)

Centre de recherches mathématiques
Pavillon André-Aisenstadt
Université de Montréal
Salle / Room 5340
14h00 / 2:00 pm

<http://www.crm.math.ca/Eynard>

MINI-COURS / MINI-COURSES

Du 29 septembre au 3 novembre 2015 / From September 29 to November 3, 2015)

Tous les mini-cours au CRM se dérouleront à l'Université de Montréal, Pavillon André-Aisenstadt, 2920, Chemin de la tour, salle 4336.

Tous les mini-cours à Concordia se dérouleront au Library Building, Concordia University, 1400 Boul. de Maisonneuve Ouest, Math Help Center, salle 921.04 LES MERCREDIS/salle 912.00 LES JEUDIS

All mini-course lectures at the CRM will take place on the campus of the Université de Montréal, Pavillon André-Aisenstadt, 2920, Chemin de la tour, Room 4336.

All mini-course lectures at Concordia will take place at the Library Building, Concordia University, 1400 de Maisonneuve Blvd. West, Math Help Center, room 921.04 ON WEDNESDAYS/room 912.00 ON THURSDAYS.

Mini-cours I / Mini-course I
(29 septembre - 15 octobre, 2015 / September 29 - October 15, 2015)

"Introduction to topological recursion"

This series is an introduction to topological recursion, both by treating examples, and explaining the general formalism. The goal is to arrive at the proof that Gromov-Witten invariants satisfy the topological recursion.

Topological recursion is an ubiquitous and universal recursive relationship that has appeared in various domains of mathematics and physics: volumes of moduli spaces, coefficients of asymptotic expansions in random matrix theory, Hurwitz numbers and many other combinatorial objects, Gromov-Witten invariants, all mysteriously satisfy the same relation. Moreover, this recursion relation is effective: it allows an actual computation of all functions, provided that one knows the 1st one, called the spectral curve.

- Mardi 29 septembre / Tuesday, September 29
CRM, 15:30 - 16:30, Séminaire de Physique Mathématique

"Introduction to topological recursion: examples"
Résumé / Abstract: Hurwitz numbers and Mirzakhani's recursion

- Jeudi 1er octobre / Thursday, October 1
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"General topological recursion"
Résumé / Abstract: Notion of spectral curves, basic algebraic geometry of plane curves. (Ref: Fay's lectures on "Theta functions on Riemann surfaces")

- Mardi 6 octobre / Tuesday, October 6
CRM, 15:30 - 16:30, Séminaire de Physique Mathématique

"Diagrammatic computation, link to Givental's formalism, properties"
Résumé / Abstract: Diagrammatic computation, symplectic invariance, modular invariance, singular limits, form-cycle duality.

- Mercredi 7 octobre / Wednesday, October 7
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"Topological recursion: links to integrable systems"

Résumé / Abstract: Notion of tau functions, Baker-Akhiezer functions, Sato relations.

- Jeudi 8 octobre / Thursday, October 8
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"Moduli spaces and Gromov-Witten theory"

- Jeudi 15 octobre / Thursday, October 15
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"Topological recursion and asymptotics"
Résumé / Abstract: Topological recursion and asymptotics. Link to knot theory.

Mini-cours II / Mini-course II
(21 octobre - 3 novembre, 2015 / October 21 - November 3, 2015)

"Integrable systems, random matrices, Hitchin systems and CFTs"

Random matrices are a prototype of most integrable systems. We will use them to illustrate many features of integrable systems. The goal is to arrive at a general formalism for all integrable systems.

- Mercredi 21 octobre / Wednesday, October 21
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"Introduction to integrable systems and solutions"
Résumé / Abstract: The Lax formalism, isospectral systems, algebro-geometric solutions (Baker Akhiezer functions), prime forms, and theta functions. Hitchin systems.

- Jeudi 22 octobre / Thursday, October 22
Concordia, 16:00 - 18:00, Working Seminar in Mathematical Physics

"Random matrices, orthogonal polynomials isospectral flows"
Résumé / Abstract: Random matrices and orthogonal polynomials, expectation values of resultants, and expectation values of characteristic polynomials. Isospectral systems from the ODEs satisfied by orthogonal polynomials Notion of Miwa-Jimbo Tau function, Fay identities, Hirota equations, Sato relations.

- Jeudi 29 octobre / Thursday, October 29
Concordia, 16:00 - 17:00, Working Seminar in Mathematical Physics

"Introduction to Hitchin systems and CFT's"
Résumé / Abstract: Liouville theory 4-point function is related to the Painlevé VI tau function. We propose a systematic construction of CFT amplitudes from an arbitrary Hitchin system.

- Mardi 3 novembre / Tuesday, November 3
CRM, 15:30 - 16:30, Séminaire de Physique Mathématique

"Hitchin systems and CFT's"
Résumé / Abstract: This Liouville theory 4-point function is related to the Painlevé VI tau function.

<http://www.crm.math.ca/minicoursEynard>
