Master Class: Recursion from matrix models to quantum algebraic geometry
by Bertrand Eynard and Nicolas Orantin
21 – 25 Jan 2013

Monday 21 Jan

9.30-10.00 Coffee/tea outside the auditorium

10.00-10.45

Introduction: introductory examples of application of the TR: Weil-Petersson volumes, Hurwitz numbers and others (Gromov-Witten, Kontsevich, maps, crystal models…) (Eynard)

11.15-12.00 As above

12.00-14.00 Lunch

14.00-14.45

Main definition: Some "reminders" of complex analysis on Riemann surfaces: algebraic curves, holomorphic forms, 2nd kind differential. Branchpoints, Galois conjugate. Examples of spectral curves of genus 1: Seiberg-Witten SU(2), local P^2,… Examples not hyperelliptical: (p,q)=(4,3) model Writing the main definition of the Topological recursion, writing the F_g's. (Orantin)

14.45-15.15 Afternoon tea outside the auditorium

15.15-16.00 As above

18.00- Wine and cheese (location TBA)

Tuesday 22 Jan

9.30-10.00 Coffee/tea and bread rolls outside the auditorium

10.00-10.45

Examples of computations with the Topological recursion: W_{03}, W_{11}, … Writing as 3-valent graphs (Orantin)

11.15-12.00 As above

12.00-14.00 Lunch

14.00-14.45

Properties: symmetry of W_{g,n}, no residue, dilaton equation, special geometry form-cycle duality, symplectic invariance, modular transformations, Virasoro,… (Orantin)

14.45-15.15 Afternoon tea outside the auditorium

15.15-16.00 As above

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Wednesday 23 Jan

9.30-10.00 Coffee/tea and bread rolls outside the auditorium

10.00-10.45

Properties: symmetry of W_{g,n}, no residue, dilaton equation, special geometry form-cycle duality, symplectic invariance, modular transformations, Virasoro,… (Orantin)

11.15-12.00 As above

12.00-14.00 Lunch

14.00-14.45 As above

14.45-15.15 Afternoon tea outside the auditorium

15.15-16.00 As above

Thursday 24 Jan

9.30-10.00 Coffee/tea and bread rolls outside the auditorium

10.00-10.45

Writing the W_{g,n}'s and F_g's as intersection numbers, Laplace transform of spectral curves and classes. Example of applications: Recovering ELSV formula, Marino-Vafa formula (Eynard)

11.15-12.00 As above

12.00-14.00 Lunch

14.00-14.45

Non-perturbative part, background independence, modular invariance (Eynard)

14.45-15.15 Afternoon tea outside the auditorium

15.15-16.00 As above

18.00-22.30 Special dinner at (TBA)

Friday 25 Jan

10.00-10.45 Coffee/tea and bread rolls outside the auditorium

10.00-10.45

Integrability, Hirota equations (Eynard)

11.15-12.00 As above

12.00-14.00 Lunch