SEMPARIS – Séminaires en région parisienne

http ://string.lpthe.jussieu.fr/semparis/

Cours

Vendredi 21 Octobre 2022, 10 :00
IPHT, Salle Claude Itzykson, Bât. 774
Domaines : physics

Titre : *Introduction to Topological Recursion*

Orateur : **Bertrand Eynard (IPhT)**

Résumé : *Videoconference : subscribe to the course newsletter to receive links*
Abstract :
Topological Recursion is a mathematical tool. From an initial data S, called the spectral curve, the recursion produces a sequence $\omega_{g,n}(S)$ *indexed by two integers g,n. These sequences have many applications that range from string theory to random matrices, statistical physics on a random lattice, integrable systems, WKB asymptotics, CFT, ... We shall introduce Topological Recursion by examples and concrete applications, and mention some long-reach issues.*
Plan :
1) Introduction by examples of spectral curves : random matrix spectral densities (semi-circle $y = \sqrt{1-x^2}$*), the Witten-Kontsevich curve (*$y = \sqrt{x}$*), and the Mirzakhani's curve (*$y = \sin\sqrt{x}$*), and their applications, in particular the volumes of the space of hyperbolic surfaces, the Mirzakhani's recursion.*
2) Going from examples to general Topological Recursion. Practical methods for computing Topological Recursion, in particular graphical methods, and general properties.
3) Link to the geometry of surfaces : moduli space of Riemann surfaces, cohomological field theories, towards string theory.
4) Topological Recursion as a powerful method to compute WKB series. Link to differential equations and integrable systems.