

Elba Garcia-Failde

Title: Generalised Kontsevich graphs, topological recursion and r-spin intersection numbers.

In this talk I will provide a brief and gentle introduction to Witten's conjecture, which predicts that the generating series of certain intersection numbers on the moduli space of curves is a tau function of the KdV integrable hierarchy, as a motivation for r-spin Witten's conjecture that concerns much more complicated geometric objects and specialises to the original conjecture for $r=2$. The $r=2$ conjecture was proved for the first time by Kontsevich making use of maps arising from a cubic hermitian matrix model with an external field. Together with R. Belliard, S. Charbonnier and B. Eynard, we studied the combinatorial model that generalises Kontsevich maps to higher r . Making use of some auxiliary models we manage to find a Tutte-like recursion for these maps and to massage it into a topological recursion. We also show a relation between a particular case of our maps and the r-spin intersection numbers, which allows us to prove that these satisfy topological recursion. Finally, I will explain how, in joint work with G. Borot and S. Charbonnier, we relate another specialisation of our models to fully simple maps, and how this identification helps us prove that fully simple maps satisfy topological recursion for the spectral curve in which one exchanges x and y from the spectral curve for ordinary maps. This solved a conjecture from G. Borot and myself from '17.