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*Matrix models, beta-ensembles and "quantum" algebraic geometry*

The talk will deal with the resolution of two different regimes in random matrix models. First I will briefly review the notion of "symplectic invariants" introduced by Eynard and Orantin to solve the hermitian matrix models. In particular this model has application in combinatorial geometry (BKMP conjecture). Then I will develop another regime of matrix models, in relation with  $\beta$ -ensembles, that can be viewed as a non-commutative version of the previous formalism. Instead of dealing with a standard algebraic curve and build algebraic invariants from it, the situation involves an ODE which in the easiest case of the one-matrix model can be rewritten as a Schrödinger equation. From this equation, we develop a similar formalism that share almost the same properties as in the hermitian case.