



**UNIVERSITÄT
BIELEFELD**



Faculty of Physics



Faculty of Mathematics

Colloquium Mathematical Physics

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Matrix models and topological recursion

Matrix models provide generating functions for enumeration problems and for toy models of quantum-mechanical systems and quantum field theory. It has been observed that the large-size expansion of expectation values in matrix models can be recursively evaluated once a few initial data, called the spectral curve, is identified. Such "topological recursions" are common to many examples in enumerative geometry, Hurwitz theory, Gromov-Witten theory, free probability and more. Their investigation has revealed surprising relations between complex algebraic geometry, enumerative geometry, intersection theory on the moduli space of curves and integrable systems. I plan to sketch a few of these developments and introduce an example where a deformation of topological recursion is necessary.

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