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Complex dynamics for the Lee–Yang zeros

In a classical work, Yang and Lee proved that zeros of certain polynomials (partition functions of Ising models) always lie on the unit circle. Distribution of these zeros control phase transitions in the model. We study this distribution for a special "Migdal–Kadanoff hierarchical lattice". In this case, it can be described in terms of the dynamics of an explicit rational function in two variables. We show that the Yang–Lee zeros are organized in a transverse measure for a dynamical foliation on an invariant cylinder. From the complex point of view, they get interpreted as slices of a dynamical $(1,1)$-current on the projective space.

This is a joint work with Pavel Bleher and Mikhail Lyubich.