

Pjotr Buys (University of Amsterdam):

Thursday, June 10th, 10:00-10:45 EDT.

Title: Lee-Yang Zeros and the Complexity of the Ferromagnetic Ising Model on Bounded-Degree Graphs

Abstract: I will speak about the computational complexity of approximating the partition function of the ferromagnetic Ising model for bounded degree graphs when the external field parameter λ lies on the unit circle. The complex zeros of this model are contained in the unit circle. Recently, deterministic approximation schemes have been developed for those λ that lie in zero-free regions, i.e. for λ either not on the unit circle or on a zero-free arc of the unit circle. We have shown that, **for most** λ that lie on a circular arc on which zeros are dense, approximating the partition function is $\#P$ -hard. In this talk I will highlight some of the steps that were used in the proof, focussing on the analysis of the complex dynamical systems that arise from the graph constructions involved.

This is joint work with Andreas Galanis, Viresh Patel and Guus Regts.