

The Mathematics Research Center
Distinguished Lecture Series
Presents



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Tuesday, February 5th 2019, 4:30 – 5:30 pm, Room 380W

An improvement of Liouville's theorem for discrete harmonic functions

The classical Liouville theorem says that if a harmonic function on the plane is bounded then it is a constant. At the same time for any angle on the plane, there exist non-constant harmonic functions that are bounded everywhere outside the angle.

The situation is different for discrete harmonic functions on the standard square lattices. The following strong version of the Liouville theorem holds on the two-dimensional lattice. If a discrete harmonic function is bounded on a large portion of the lattice then it is constant. A simple counter-example shows that in higher dimensions such improvement is no longer true. There are also some open interesting questions in higher dimensions that we will discuss.

The talk is based on a joint work with L. Buhovsky, A. Logunov and M. Sodin