
* Princeton Discrete Math Seminar *

Date: Wednesday, March 30, 2:15 in Fine Hall 224

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**Applications of the local weak convergence
method to random graph problems**

Abstract

Local Weak Convergence method (LWC) exploits local structure (typically a tree) of a large random combinatorial object and leads to a complete asymptotic solution to several optimization problems on random graphs. The method reduces the original problem into the problem of finding fixed points of a certain distributional operator. We show that when the fixed point of the second iterate of the distributional operator is unique, it determines the value of the underlying combinatorial optimization problem. We demonstrate this on a problem of finding maximum weighted independent set in a sparse random graph. Our method has its origins in the cavity method from statistical physics and we explore further this interesting connection including correlation decay and high/low temperature regimes in statistical mechanics models.

Joint work with Tomasz Nowicki and Grzegorz Swirszcz (IBM).