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Title: The triangle-free process and R(3,k)

Abstract:

Given n vertices, let us add edges one by one at random, accepting every edge which does not create a triangle, and rejecting the rest. This "triangle-free process" was suggested by Bollob\'as and Erd\H{o}s in 1990 as a possible method of producing good Ramsey graphs, but until Bohman's breakthrough paper in 2009, which determined the order of magnitude of e(G_{n,\triangle}), very little was known about the random triangle-free graph G_{n,\triangle} it produces.

In this talk we discuss a recent refinement of Bohman's result, which determines asymptotically the number of edges in G_{n,\triangle}, and moreover shows that it shares many properties with the Erd\H{o}s-R\'enyi random graph G(n,m) of the same density. As an application, we improve Kim's lower bound on the Ramsey number R(3,k), obtaining a bound within a factor of four of Shearer's upper bound.

This is joint work with Gonzalo Fiz Pontiveros and Simon Griffiths. Similar results were obtained independently by Tom Bohman and Peter Keevash.