## Mantel's Theorem for Random Graphs

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## Abstract

For a graph G, let t(G) (resp. b(G)) denote the maximum size of a trianglefree (resp. bipartite) subgraph of G. Of course  $t(G) \ge b(G)$  for any G, and a classic result of Mantel from 1907 (the first case of Turan's Theorem) says  $t(K_n) = b(K_n)$  (where  $K_n$  is the complete graph on n vertices). A natural question first considered by Babai, Simonovits and Spencer about 20 years ago is, when (i.e. for what p = p(n)) is the "Erdos-Renyi" random graph G = G(n, p) likely to satisfy t(G) = b(G)? We show that this is true if  $p > Cn^{-1/2}log^{1/2}(n)$  for a suitable constant C, which is best possible up to the value of C. (Joint with Bobby DeMarco)