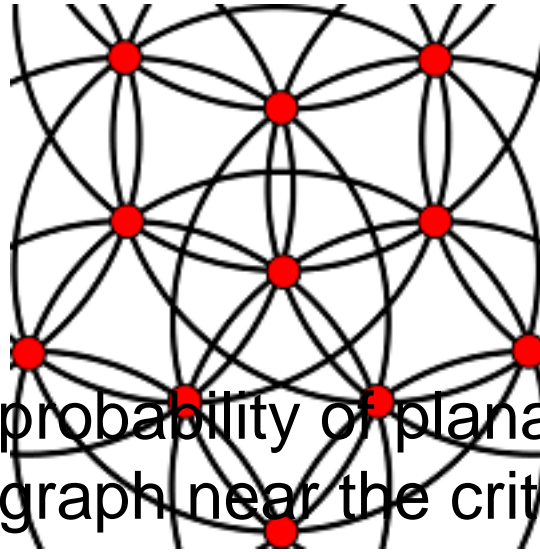


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On the probability of planarity of a random graph near the critical point

Content :

Consider the uniform random graph $G(n, M)$ with n vertices and M edges. Erdős and Rényi (1960) conjectured that the limit

$$\lim P[G(n, n/2) \text{ is planar}]$$

exists and is a constant strictly between 0 and 1. Łuczak, Pittel and Wierman (1994) proved this conjecture and Janson, Łuczak, Knuth and Pittel (1993) gave lower and upper bounds for this probability.

In this work we determine the exact probability of a random graph being planar near the critical point $M=n/2$. More precisely, for each u , we find an exact analytic expression for

$$p(u) = \lim P[G(n, n/2(1+u n^{-1/3})) \text{ is planar}].$$

In particular, we obtain that $p(0)$ is approximately equal to 0.99780. Additionally, we are also capable to extend these results to classes of graphs closed under taking minors.

This is a joint work with Marc Noy (UPC-Barcelona) and Vlady Ravelomanana (LIAFA-Paris), available on-line at <http://arxiv.org/abs/1204.3376>.

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