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*Towards the distribution of the size of the largest non-crossing matchings in random bipartite graphs*

We consider the following question: When a randomly chosen regular bipartite multi-graph is drawn in the plane in the “standard way”, what is the distribution of its maximum size planar matchings (sets of non-crossing disjoint edges)? The problem is a generalization of the Longest Increasing Sequence (LIS) problem (also called Ulam’s problem). We first generalize Gessel’s identity. Then, among other things, we show how to count, for small values of  $d$  and  $r$ , the number of  $r$ -regular bipartite multi-graphs with maximum planar matchings of size  $d$ .

Joint work with Martin Loeb (Charles U.)