

Correlation Decay and Central Limit Theorem for Maximum Weight Matching on Sparse Random Graphs

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Abstract

A matching of a graph is a set of edges such that no two edges share common vertices. Suppose that the graph is finite. We put i.i.d. exponential random weights on the edges, and study the maximum weight matching (that is, the matching such that the total weight is maximum) on the graph. We show that if the graph is locally tree-like and if the degree is bounded, then the model exhibits a form of correlation decay: if two edges are far apart, then in a certain sense whether they are in the matching will be asymptotically independent. Using this, we show a Gaussian central limit theorem for maximum weight matching on locally tree-like graphs with bounded degree. As an application, we show an “annealed” Gaussian central limit theorem for maximum weight matching on uniformly chosen random simple graphs with bounded degree. Joint work with Arnab Sen (Minnesota).