Comparable pairs and linear extensions

David Penman

University of Essex

We study the number of linear extensions of a finite poset on n vertices with a given proportion of comparable pairs of elements, considering both the maximum and minimum value. We use martingale techniques to give a simple upper bound and also give some consideration to the case when the proportion of comparable elements is close to 1. We also give a lower bound on the minimum number of linear extensions and again discuss what happens when the proportion is close to 0 or 1. We discuss briefly our lack of success in getting the entropy bounds on numbers of linear extensions to sharpen our results, and close by estimating the number of linear extensions of a random interval order **whp**. Some open problems are also listed.

This is joint work with Colin McDiarmid and with Vasileios Iliopoulos,
https://arxiv.org/abs/1603.02901