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Preferential attachment graphs: random initial degrees

Wednesday, 23 September 2026 15:00 (30 minutes)

First, we consider the so-called preferential attachment random graphs, which appear extensively in the mathematics, physics, and computer science literature. We then present some variants in which the attachment mechanism is not of pure preferential type, or in which the initial degrees with which the nodes appears in the graph are random. In particular, regarding the latter case, we address the open problem concerning the possible lack of concentration of the degree distribution when distribution of the initial degrees is characterized by extremely heavy tails of power-law type. We show that the addition of such a large number of edges causes a significant upset of the degree distribution, leading to its non-concentration. Furthermore, we show that the smallest value of the exponent for which the degree distribution exhibits concentration is 2.

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