# ISSUES IN RANDOM NETWORKS-THE APOLLONIAN NETWORK AS A CASE STUDY

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Abstract. We briefly review a number of random networks in recent areas of interest of the speaker, and discuss the issues that arise. We present the Apollonian network as a case study. We study the distribution of the degrees of vertices as they age in the evolutionary process. Asymptotically, the (suitably-scaled) degree of a node with a fixed label has a Mittag-Leffler-like limit distribution. The degrees of nodes of later ages have different asymptotic distributions, influenced by the time of their appearance. The very late arrivals have a degenerate distribution. The result is obtained via triangular Plya urns. Also, via the Bagchi-Pal urn, we show that the number of terminal nodes asymptotically follows a Gaussian law. We prove that the total weight of the network asymptotically follows a Gaussian law, obtained via martingale methods. Similar results carry over to the sister structure of the k-trees.