Random Models for Geometric Graphs (Abstract)

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Abstract. In the last decade there has been an increasing interest in graphs whose nodes are placed in the plane. In particular when modeling the communication pattern in wireless ad-hoc networks. The different communication ways or protocol implementations have directed the interest of the commnity to study and use different intersection graph families as basic models of communication. In this talk we review those models when the graph nodes are placed at random in the plane. In general we assume that the set of vertices is a random set of points generated by placing n points uniformly at random in the unit square. The basic distance model, the *random geometric graph* connects two points if they are at distance at most r where r is a parameter of the model [2]. A second model is the *k-neighbor graph* in which each node selects as neighbors the k-nearest neighbors in P [3]. Another variation, inspired by the communication pattern of directional radio frequency and optical networks, is the *random sector graph*, a generalization of the random geometric graph introduced in [1]. In the setting under consideration, each node has a fixed angle α ($0 < \alpha \leq 2\pi$) defining a sector S_i of transmission determined by a random angle between the sector and the horizontal axis. Every node that falls inside of S_i can potentially receive the signal emitted by i. In this talk we survey the main properties and parameters of such random graph families, and their use in the modelling and experimental evaluation of algorithms and protocols for several network problems.

References

1. Díaz, J., Petit, J., Serna, M.: A random graph model for optical networks of sensors. IEEE Transactions on Mobile Computing 2, 143–154 (2003)
2. Penrose, M.D.: Random Geometric Graphs. Oxford Studies in Probability, Oxford U.P (2003)
3. Xue, F., Kumar, P.R.: The number of neighbors needed for connectivity of wireless networks. Wireless Networks 10(2), 169–181 (2004)

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