Meeting: 1001, Evanston, Illinois, SS 2A, Special Session on Extremal Combinatorics

1001-05-391

Robert B. Ellis* (`rellis@math.tamu.edu`), Department of Mathematics, MS 3368, Texas A&M University, College Station, TX 77843-3368, **Xingde Jia**, Texas State University-San Marcos, **Jeremy L. Martin**, University of Minnesota, and **Catherine H. Yan**, Texas A&M University.

Random geometric graph diameter threshold in the unit disk. Preliminary report.

Let n be a positive integer, and $\lambda > 0$ a real number. Let V_n be a set of n points randomly located within the unit disk, which are mutually independent. Define $G(\lambda, n)$ to be the graph with the vertex set V, in which two vertices are adjacent if and only if their Euclidean distance is at most λ. We call this graph the *unit disk random graph*. M. Penrose proved that the threshold λ_c for graph connectivity coincides with the threshold λ_1 for minimum vertex degree ≥ 1; for the unit disk random graph this value is $\lambda_c = \lambda_1 = \sqrt{\ln n/n}$. We examine the graph diameter of $G(\lambda, n)$ as soon as λ exceeds $\sqrt{\ln n/n}$, employing the following fact: There exists an absolute constant K such that if $G(\lambda, n)$ is connected, any two vertices u, v are connected by a path in $G(\lambda, n)$ of length at most $Kd(u, v)/\lambda$, where $d(u, v)$ is the Euclidean distance between u and v. (Received August 31, 2004)