

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

1001-05-136 **Tao Jiang*** (jiangt@muohio.edu), Department of Mathematics and Statistics, Miami University, Oxford, OH 45056, and **Dan Pritikin**. *The Steiner Problem in the hypercube*. Preliminary report.

The Steiner problem seeks, for given a set W of vertices in a connected host graph G , a tree of minimum size that contains all of W . Such a tree is called a Steiner tree for W . The Steiner problem has been extensively studied and has important applications in as diverse areas as VLSI-layout and phylogenetic trees.

Here, we consider the Steiner problem in the hypercube. Given a set W of vertices in the n -dimensional cube Q_n , let $L(W)$ denote the size of a Steiner tree for W . Let $f(n, k)$ denote the maximum value of $L(W)$ over all sets W of k vertices. For all k relatively small compared to 2^n , we obtain asymptotically tight bounds on $f(n, k)$, showing that $f(n, k) = (1/3)nk + o(nk)$. Our upper bound is of an algorithmic nature while the lower bound is probabilistic. We will also briefly discuss the general behavior of the function $L(W)$. (Received August 20, 2004)