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THE MEDIAN PROBLEM ON k-PARTITE GRAPHS

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Abstract

In a connected graph G, the status of a vertex is the sum of the distances of that vertex to each of the other vertices in G. The subgraph induced by the vertices of minimum (maximum) status in G is called the median (anti-median) of G. The median problem of graphs is closely related to the optimization problems involving the placement of network servers, the core of the entire networks. Bipartite graphs play a significant role in designing very large interconnection networks. In this paper, we answer a problem on the structure of medians of bipartite graphs by showing that any bipartite graph is the median (or anti-median) of another bipartite graph. Also, with a different construction, we show that the similar results hold for k-partite graphs, $k \geq 3$. In addition, we provide constructions to embed another graph as center in both bipartite and k-partite cases. Since any graph is a k-partite graph, for some k, these constructions can be applied in general.

Keywords: networks, distance, median, bipartite, k-partite.

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