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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References


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