

# An axiomatization of the median procedure on the $n$ -cube

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## Abstract

The general problem in location theory deals with functions that find sites on a graph (discrete case) or network (continuous case) in such a way as to minimize some cost (or maximize some benefit) to a given set of clients represented by vertices on the graph or points on the network. The axiomatic approach seeks to uniquely distinguish, by using a list of intuitively pleasing axioms, certain specific location functions among all the arbitrary functions that address this problem. For the median function, which minimizes the sum of the distances to the client locations, three simple and natural axioms, anonymity, betweenness, and consistency suffice on tree networks (continuous case) as shown by Vohra [?], and on cube-free median graphs (discrete case) as shown by McMorris et.al. [?]. In the latter paper, in the case of arbitrary median graphs, a fourth axiom was added to characterize the median function. In this note we show that, at least for the hypercubes, a special instance of arbitrary median graphs, the above three natural axioms still suffice.

**Keywords:** median, median function, hypercube, location function, consensus axiom