

Average distance in weighted graphs

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Let G be a given connected graph on n vertices. Suppose N facilities are located in the vertices of the graph. We consider the expected distance between two randomly chosen facilities. This is modelled by the following definition:

Let G be a connected graph and let each vertex have weight $c(v)$. The average distance of G with respect to c is defined as

$$\mu_c(G) = \binom{N}{2}^{-1} \sum_{\{u,v\} \subseteq V(G)} d_G(u,v),$$

where $N = \sum_{v \in V(G)} c(v)$, and $d_G(u,v)$ is the distance in G between u and v , i.e., the length of a shortest $u-v$ path in G .

In this talk we consider bounds on $\mu_c(G)$ in terms of properties of G . We specifically consider the case when G is a tree.