

1162-05-92

Emily Yi Zhang* (eyzhang@mit.edu), Madison, MS 39110. *On the Broadcast Dimension of a Graph.*

A function $f : V(G) \rightarrow \mathbb{Z}^+ \cup \{0\}$ is a *resolving broadcast* of a graph G if, for any distinct $x, y \in V(G)$, there exists a vertex $z \in V(G)$ with $f(z) > 0$ such that $\min \{d(x, z), f(z) + 1\} \neq \min \{d(y, z), f(z) + 1\}$. The *broadcast dimension* of G is the minimum of $\sum_{v \in V(G)} f(v)$ over all resolving broadcasts f of G . The concept of broadcast dimension was introduced by Geneson and Yi as a variant of metric dimension and has applications in areas such as network discovery and robot navigation.

In this paper, we derive an asymptotically tight lower bound on the broadcast dimension of an acyclic graph in the number of vertices, and we show that a lower bound by Geneson and Yi on the broadcast dimension of a general graph in the adjacency dimension is asymptotically tight. We also study the change in the broadcast dimension of a graph under a single edge deletion. We show that both the additive increase and decrease of the broadcast dimension of a graph under edge deletion is unbounded. Moreover, we show that under edge deletion, the broadcast dimension of any graph increases by a multiplicative factor of at most 3. These results fully answer three questions asked by Geneson and Yi. (Received August 25, 2020)