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*Exploring the Influence and Total Influence Numbers of a Graph*

Recently, the study of social networks has given rise to a graph parameter known as the *influence number*:  $\eta(G)$ . This parameter measures the influence that a vertex subset  $S$  has on the remaining vertices such that each vertex not in  $S$  is influenced by the closest member of  $S$  as follows:  $\eta(S) = \sum_{u \notin S} 2^{-d(u,S)}$ . The influence number of a graph is the maximum such value over all possible vertex subsets:  $\eta(G) = \max_{S \subseteq V} \eta(S)$ . A natural extension to the influence number allows each vertex not in  $S$  to be influenced by every vertex in  $S$ . This gives the *total influence number*:  $\eta_T(G) = \max_{S \subseteq V} [\sum_{u \in S} \sum_{v \notin S} 2^{-d(u,v)}]$ . Other applications include facility location problems where the quality of service decays exponentially with respect to distance. This talk will explore some of the basic results involving the influence and total influence numbers of a graph.