

DISTINGUISHING SETS IN GRAPHS

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A collection $S = \{S(1), S(2), \dots, S(t)\}$ of subsets of the vertex set $V(G)$ is distinguishing if every vertex is contained in at least one $S(i)$ and, for every two distinct vertices, some $S(i)$ contains exactly one of them. Distinguishing collections are of interest in finding an intruder or faulty node in a system modeled by a graph. Various situations in which a detection device at a vertex v can detect an intruder in its closed neighborhood $N[v]$ will be considered: (1) $\{v\}$ and $N(v)$ locating-dominating sets, (2) $N[v]$ identifying codes, and (3) $N(v)$ open-locating-dominating sets. Various other distinguishing collections of sets are also of interest.

With emphasis on open problems, a (partial) historical overview of these topics will be presented. Thinking of each $S(i)$ as a detector which can determine if the intruder is in set $S(i)$, various conditions under which detectors can be faulty will be discussed.