IDENTIFYING CODES IN LINE GRAPHS

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An identifying code C of a graph $G = (V, E)$ is a set of vertices of G such that $\forall x \in V, N[x] \cap C \neq \emptyset$ (where $N[x]$ denotes the closed neighbourhood of x) and $\forall u, v \in V, N[u] \cap C \neq N[v] \cap C$. In other words, C is a dominating set and every vertex have a unique neighbourhood in C. Identifying codes were introduced by Karpovsky et al. in [3].

Determining the size of a minimum identifying code of a graph G (denoted γ^{ID}), turned out to be a challenging problem and it was proved to be NP-complete even for restricted classes of graphs ([2, 1]). We present some results on *edge-identifying codes*, that is identifying codes of line graphs. We improve a well-known lower bound $\gamma^{ID}(G) > \lceil \log_2(|V(G)|+1) \rceil$ for the class of general graphs, by showing that for a line graph G, $\gamma^{ID}(G) > \frac{3\sqrt{2|V(G)|}}{4}$. We also give better upper bounds for this class of graphs. Finally, we prove that the edge-identifying code problem is NP-complete, even for the class of planar bipartite graphs of maximum degree 3 and arbitrarily large girth.

Keywords: Identifying codes, line graphs, NP-completeness.

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