IDENTIFYING CODES IN REGULAR GRAPHS

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An identifying code of a graph $G$ is a dominating set such that the neighbourhood of each vertex within the code is unique. More formally, $C$ is an identifying code if for any pair $x, y$ of vertices of $G$, $N[x] \cap C \neq \emptyset$ and $N[x] \cap C \neq N[y] \cap C$. They were introduced in [1] and are a variation of other concepts such as metric bases or locating-dominating sets [3]. Given a graph $G$, let $\gamma^{ID}(G)$ denote the identifying code number of $G$, that is, the size of a minimum identifying code of $G$.

In this talk, we show that the bound $\gamma^{ID}(G) \leq n - \frac{n}{\sqrt{d}}$ holds for any identifiable $d$-regular graph $G$ for large enough $d$. This bound is tight (up to a constant) and asymptotically settles a conjecture of the first author, R. Klasing, A. Kosowski and A. Raspaud [2] for the case of regular graphs. The bound is proved using Lovász’ Local Lemma.

We also present sharp bounds for the identifying code number of random $d$-regular graphs, which is proved to be close to $\frac{\log d}{d} n$ with high probability.

**Keywords:** Identifying code, Dominating set, Probabilistic method.

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References

