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Average eccentricity, k-packings and k-dominations in graphs

Let $G$ be a connected graph of order $n$. The eccentricity $e_G(v)$ of a vertex $v$ in $G$ is the distance from $v$ to a vertex farthest from $v$ in $G$. The average eccentricity $avec(G)$ of $G$ is defined as $avec(G) = \frac{1}{n} \sum_{v \in V(G)} e_G(v)$. Given $k \in \mathbb{N}$, a $k$-packing of $G$ is a subset $S \subseteq V(G)$ such that the distance between any two vertices in $S$ is at least $k + 1$. The maximum cardinality of a $k$-packing of $G$ is the $k$-packing number $\beta_k(G)$ of $G$. A subset $D \subseteq G$ is a $k$-dominating set of $G$ if each vertex of $G$ is within distance at most $k$ from some vertex in $D$. The minimum cardinality of a $k$-dominating set of $G$ is the $k$-domination number $\gamma_k(G)$ of $G$. In this talk we present old and new bounds on the average eccentricity of $G$ of given order and $k$-packing number or $k$-domination number.