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Broadcast domination and its dual multipackings

Given a graph G , a function $f : V \rightarrow \{0, 1, \dots, \text{diam}(G)\}$ where $f(v) \leq \text{ecc}(v)$ is a *broadcast* and is *dominating* if for each u there is v with $f(v) > 0$ and $\text{dist}(u, v) \leq f(v)$. The cost is $\sum_{v \in V} f(v)$. When f is $\{0, 1\}$ -valued, the cost is the size of a dominating set. Surprisingly *minimum broadcast domination* is polynomial time solvable. This problem admits a nice integer programming formulation, the dual of which is the maximum multipacking problem. We examine these dual problems, and conditions for equality of optimal solutions.