Deng, Yun-Ping; Sun, Yu-Qin; Liu, Qiong; Wang, Hai-Chao
Efficient dominating sets in circulant graphs. (English) Zbl 1361.05094

Summary: Let \( S \) be a subset of finite cyclic group \( \mathbb{Z}_n \) not containing the identity element 0 with \( S = -S \). Cayley graphs on \( \mathbb{Z}_n \) with respect to \( S \) are called circulant graphs and denoted by \( \text{Cay}(\mathbb{Z}_n, S) \). In this paper, for connected non-complete circulant graphs \( \text{Cay}(\mathbb{Z}_n, S) \) of degree \(|S| = p-1\) with \( p \) prime, we give a necessary and sufficient condition for the existence of efficient dominating sets, and characterize all efficient dominating sets if exist. We also obtain similar results for \( \text{Cay}(\mathbb{Z}_n, S) \) of degree \(|S| = pq-1\) and \( p^m-1 \), where \( p, q \) are primes, \( m \) is a positive integer, and \(|S|+1\) is relatively prime to \( \frac{n}{|S|+1} \). Moreover, we give a necessary and sufficient condition for the existence of efficient dominating sets in \( \text{Cay}(\mathbb{Z}_n, S) \) of order \( n = p^aq^bq^c, pqr, p^aq^bp^cq^d, p^aq^b \) and degree \(|S|\), where \( p, q, r, s \) are distinct primes, \( k \) is a positive integer, and \(|S|+1\) is relatively prime to \( \frac{n}{|S|+1} \).

MSC:
05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)
05C25 Graphs and abstract algebra (groups, rings, fields, etc.)

Keywords:
circulant graphs; Cayley graphs; efficient dominating sets

Full Text: DOI

References:

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.