

# Generalized power domination of graphs

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## Abstract

In this paper, we introduce the concept of  $k$ -power domination which is a common generalization of domination and power domination. We extend several known results for power domination to  $k$ -power domination. Concerning the complexity of the  $k$ -power domination problem, we first show that deciding whether a graph admits a  $k$ -power dominating set of size at most  $t$  is NP-complete for chordal graphs and for bipartite graphs. We then give a linear algorithm for the problem on trees. Finally, we propose sharp upper bounds for the power domination number of connected graphs and of connected claw-free  $(k + 2)$ -regular graphs.

*Keywords:* Power domination, electrical network monitoring, domination

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## 1. Introduction

In this paper we only consider simple graphs, that are graphs without multiple edges or loops. Let  $G$  be a graph with vertex set  $V(G)$  and edge set  $E(G)$ . We use the following definitions.

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