

Generalized power domination: propagation radius and Sierpiński graphs

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Abstract

The concept of k -power domination (introduced in Discrete Appl. Math. 160 (2012) 1691–1698) generalizes domination and power domination, the latter concept being used for monitoring an electric power system. The k -power domination problem is to determine a minimum size vertex subset S of a graph G such that after setting $X = N[S]$, and iteratively adding to X vertices x that have a neighbour v in X such that at most k neighbours of v are not yet in X , we get $X = V(G)$. In this paper the k -power domination number of Sierpiński graphs is determined. Propagation radius is introduced as a measure of the efficiency of power dominating sets. The propagation radius of Sierpiński graphs is obtained in most of the cases.

Keywords: power domination; electrical network monitoring; domination; Sierpiński graph; propagation radius

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1 Introduction

The motivation for the power domination in graphs is the problem of monitoring an electric power system by placing as few measurement devices in the system as possible [3]. Contrary to some other graph theory problems that are motivated by