



Majority domination in digraphs

Karam Ebadi* and Martín Manrique

Technical Institute of Urmia, Shahid Beheshti Faculty, Technical & Vocational University, Iran

Reza Jafari

Department of Mathematics Islamic Azad University of Miandoab, Iran.

J. Joseline Manora

Department of Mathematics, T. B. M. L. College, Porayar-609 307, India.

Abstract

The concept of majority domination in graphs has been defined in at least two different ways: As a function and as a set. In this work we extend the latter concept to digraphs, while we extended the former in another paper. Given a digraph $D = (V, A)$, a set $S \subseteq V$ is a *majority out-dominating set* (MODS) of D if $|N^+[S]| \geq \frac{n}{2}$. The minimum cardinality of a majority out-dominating set in D is the *set majority out-domination number* $\gamma_m^+(D)$ of D . In this work we introduce these concepts and prove some results about them, among which the characterization of minimal MODSs.

Keywords: Majority dominating set, majority out-dominating set.

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1 Introduction

This concept has interesting applications, specially related to democracy: The main idea of democracy is that of a representative group which is accepted by a majority of the population. In some way, this corresponds to majority dominating sets in undirected graphs. However, it is important to notice that the relation is actually directed: The representative group must be accepted by at least half of the population, but if the group itself accepts or not a particular sector of such population has no influence at all in the scope of simple democracy. Of course, more complex systems exist, with the aim that every important minority has some acceptance from the representative group, and those systems are better fit for large populations, like that of a country. Nevertheless, simple democracy is still the best option for small groups, like the members of a club or those of a small company. In the context of simple democracy, the concept of majority out-dominating set in digraphs works more accurately than that of majority dominating set in undirected graphs.

*Speaker