MOBILE MUTUAL-VISIBILITY SETS IN GRAPHS

Magda Dettlaff

University of Gdańsk

e-mail: magda.dettlaff@ug.edu.pl

Magdalena Lemańska

Gdańsk University of Technology

e-mail: magdalena.lemanska@pg.edu.pl

Juan A. Rodríguez-Velázquez

Universitat Rovira i Virgili

e-mail: juanalberto.rodriguez@urv.cat

Ismael G. Yero

Universidad de Cádiz

e-mail: ismael.gonzalez@uca.es

Given a connected graph G, the mutual-visibility number of G is the cardinality of a largest set S such that for every pair of vertices $x, y \in S$ there exists a shortest x, y-path whose interior vertices are not contained in S. Assume that a robot is assigned to each vertex of the set S. At each stage, one robot can move to a neighbouring vertex. Then S is a mobile mutual-visibility set of G if there exists a sequence of moves of the robots such that all the vertices of G are visited while maintaining the mutual-visibility property at all times. The mobile mutual-visibility number of G, denoted $\mathrm{Mob}_\mu(G)$, is the cardinality of a largest mobile mutual-visibility set of G. In this talk we introduce the concept of the mobile mutual-visibility number of a graph. We begin with some basic properties of the mobile mutual-visibility number of G and its relationship with the mutual-visibility number of G. We give exact values of $\mathrm{Mob}_\mu(G)$ for particular classes of graphs, i.e. cycles, wheels, complete bipartite graphs, and block graphs (in particular trees). Moreover, we present bounds for the lexicographic product of two graphs and show characterizations of the graphs achieving the limit values of some of these bounds. As a consequence of this study, we deduce that the decision problem concerning finding the mobile mutual-visibility number is NP-hard. Finally, we focus our attention on the mobile mutual-visibility number of line graphs of complete graphs, prism graphs and strong grids of two paths.