STRONG PROPER VERTEX CONNECTION IN DIGRAPHS

Elżbieta Sidorowicz

University of Zielona Góra

e-mail: e.sidorowicz@wmie.uz.zgora.pl

Yingbin Ma, Kairui Nie, Mingli Wang

Henan Normal University

e-mail: mayingbincw@htu.cn, niekairui@163.com, wangmingli@stu.htu.edu.cn

An vertex-colored path is vertex proper if it does not contain two adjacent vertices with the same color. An vertex-colored digraph D is properly vertex connected if, between every ordered pair of vertices, there is a directed proper path. A vertex-colored digraph D is strong properly vertex connected if there exists a vertex proper geodesic between any ordered pair of vertices. The smallest number of colors needed to make D (strong) properly vertex connected is called the (strong) proper vertex connection number of D. The proper vertex connection number and strong proper vertex connection number of D is denoted by $\overrightarrow{pvc}(D)$ and $\overrightarrow{spvc}(D)$, respectively.

It is known that the proper vertex connection number of any strong digraph is at most 3 ([1]). However, the strong proper vertex connection number can be arbitrarily large ([2]). In this talk, we will provide some properties of the strong properly connected vertex-coloring. Additionally, we will present upper bounds on the strong proper vertex connection number for some classes of digraphs.

References

[1] G. Ducoffe, R. Marinescu-Ghemeci, A. Popa, On the (di)graphs with (directed) proper connection number two, Discrete Appl. Math. 281 (2020), 203-215.

[2] K. Nie, Y. Ma, E. Sidorowicz, (Strong) Proper vertex connection of some digraphs. Appl. Math. Comput. 458 (2023), 128243.