Non-disjoint Path Covering Number of Threshold Graphs

Stanley Florkowski*, Garth Isaak, Lehigh University

P. J. Slater published a paper in 1979 entitled "Path Coverings of the Vertices of a Tree" where he continued work on a problem started several years before by Boesch, Chen, McHugh and at the same time in a different form by Goodman and Hedetniemi. The path covering number of a graph is the minimum number of paths required to cover all vertices. Traditionally, the paths must be vertex disjoint, however we relax this restriction and examine an alternate version where the paths need not be vertex disjoint. The traditional path cover is related to the scattering number of a graph, while this alternate version has similarities to the reciprocal of the toughness of a graph. We discuss some basic basic aspects of this alternate path cover and provide best-possible bounds and a simple algorithm for the path cover number of threshold graphs.

Keywords: path cover number, scattering number, graph toughness, threshold graph