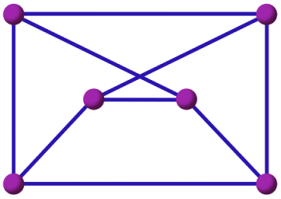

SEMINARIUM
MATEMATYKA DYSKRETNA

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# ON GENERALISED VERTEX-COVER

Gabriel Semanišin
*Institute of Computer Science, P.J. Šafárik University, Košice, Slovakia*

Given a graph $G = (V, E)$ and a positive integer $k$, a subset $S$ of vertices of $G$ is called a *$k$-path vertex cover* if $S$ intersects all paths of order $k$ in $G$ (in other words, each path of order $k$ contains a vertex from $S$). The cardinality of a minimum $k$-path vertex cover is called the *$k$-path vertex cover number* of a graph $G$, denoted by $\psi_k(G)$. Clearly for $k = 1$ the $k$-path vertex cover number corresponds to the order of a graph, and for $k = 2$ we obtain well-known *vertex cover number*.

It is also natural to consider the weighted version of the mentioned problem, in which vertices are given weights Obviously this problem is a generalization of the *Minimum Weight Cover Problem* that plays a central role in the Computational Complexity Theory. It is a special case of the *Vertex Deletion Problem* that can be stated as follows: In a given vertex weighted graph find a minimum weight set of vertices whose deletion gives a graph satisfying a prescribed property. For instance an important special case of the Vertex Deletion Problem is the *Feedback Problem*: In a given graph $G = (V, E)$ find a minimum weight set $F$ of vertices such that the graph $G[V \setminus F]$ induced by $V \setminus F$ has no cycle.

In our contribution we shall present some results and algorithms concerning $k$-path vertex cover and weigted *$k$-path vertex cover*.