Dong, Yanxia; Xue, Tao; Zhang, Guang  
k-tuple domination in generalized de Bruijn digraphs. (Chinese. English summary)  

Summary: Let $G = (V, A)$ be a digraph with vertex set $V$ and arc set $A$. A set $D_k$ of vertices of $G$ is a $k$-tuple dominating set of $G$ if for every vertex $v \in V(G) \setminus D_k$, there exists $u_i \in D_k$ (possibly some vertex $u_i = v$) such that arcs $(u_i, v) \in A(G)$ for $1 \leq i \leq k$. The $k$-tuple domination number $\gamma \times k(G)$ of $G$ is the cardinality of a minimum $k$-tuple dominating set of $G$. In this paper we present a new upper bound on the $k$-tuple domination number of generalized de Bruijn digraphs $G_B(n, d)$. Furthermore, the method of constructing a $k$-tuple dominating set of generalized de Bruijn digraph is given. For special generalized de Bruijn digraphs, we further improve the bounds on $k$-tuple domination number by directly constructing $k$-tuple dominating sets.

MSC:  
05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)  
05C20 Directed graphs (digraphs), tournaments

Keywords:  
generalized de Bruijn digraphs; dominating set; $k$-tuple dominating set

Full Text: DOI