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**Catherine Kruger\*** (cikruger@eiu.edu), **Saad El-Zanati** and **Jessica Klister**. *On Rosa-type labelings of directed graphs.*

Let  $\mathbb{Z}$  denote the set of integers. For integers  $a$  and  $b$  with  $a \leq b$ , let  $[a, b] = \{x \in \mathbb{Z} : a \leq x \leq b\}$ . Let  $K_k^*$  denote the complete directed graph on  $k$  vertices. Let  $G$  be a directed graph with  $n$  arcs on  $\leq n + 1$  vertices. A *labeling* of  $G$  is a one-to-one function  $f: V(G) \rightarrow [0, n]$ . If  $f$  is a labeling of  $G$  and  $e = (u, v) \in E(G)$ , let  $\bar{f}(e) = f(v) - f(u)$  if  $f(v) > f(u)$  and let  $\bar{f}(e) = n + 1 + f(v) - f(u)$  if  $f(v) < f(u)$ . A labeling  $f$  of  $G$  is a *directed  $\rho$ -labeling* of  $G$  if  $\{\bar{f}(e) : e \in E(G)\} = [1, n]$ . It can be shown that for such a  $G$ , there exists a cyclic  $G$ -decomposition of  $K_{n+1}^*$  if and only if  $G$  admits a directed  $\rho$ -labeling. If  $G$  is bipartite, we define a labeling of  $G$  that leads to cyclic  $G$ -decompositions of  $K_{nx+1}^*$  for every positive integer  $x$ . We investigate these and other labelings of some classes of directed graphs and give the corresponding decomposition results. (Received September 22, 2011)