1125-VF-842 **Murong Xu*** (xumurong@math.wvu.edu), 7205 University Commons Dr., Morgantown, WV 26505, and **Janet Anderson**, **Suohai Fan**, **Hong-Jian Lai** and **Xiaoxia Lin**. *An extremal problem in digraph connectivity.*

A digraph D is strong if for any pair of vertices $u, v \in V(D)$, D always contains a (u, v)-dipath. The strong arc connectivity of a digraph D, denoted by $\lambda(D)$, is the minimum number of arcs whose removal results in a non-strong digraph. If we just count the number of arcs in a digraph, can we predict that D contains a subdigraph with high strong arc connectivity? We define $\overline{\lambda}(D) = \max\{\lambda(H) : H \subseteq D\}$. Given an integer $k > 0$, a strict digraph D is k-maximal if $\overline{\lambda}(D) \le k$ but adding any arc which is not in D will surely create a subdigraph with strong arc connectivity at least $k+1$. Mader [Math. Ann. 1971] and Lai [JGT 1990] studied the extremal size of undirected k-maximal graphs. In this project, we determine that if D is a k-maximal digraph on $n > k$ vertices, then

$$\binom{n}{2} + (n-1)k + \lfloor \frac{n}{k+2} \rfloor \left(1 + 2k - \binom{k+2}{2}\right) \le |A(D)| \le k(2n-k-1) + \binom{n-k}{2}.$$

Consequently, if $|A(D)| > k(2n-k-1) + \binom{n-k}{2}$, then D must have a nontrivial subdigraph H such that the strong arc connectivity of H is at least $k+1$. (Received September 12, 2016)