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Blair Dowling Sullivan* (bdowling@princeton.edu), Mathematics Department, Fine Hall,
Washington Rd., Princeton, NJ 08544. *Feedback Arc Sets and Girth in Digraphs.*

Given a directed graph G with girth at least m (and no parallel edges), let $\beta(G)$ denote the size of the smallest subset $X \subseteq E(G)$ so that $G \setminus X$ has no directed cycles, and let $\gamma(G)$ be the number of non-edges. When $m = 3$, observe that if $\gamma(G) = 0$ (G is a tournament), then $\beta(G) = 0$. This helped motivate the conjecture that $\beta(G) \leq \frac{\gamma(G)}{2}$ when $m = 3$, studied jointly with M. Chudnovsky and P. Seymour. In this talk, I will discuss a generalized conjecture which bounds $\beta(G)$ in terms of $\gamma(G)$ and m , namely $\beta(G) \leq \frac{2}{m^2-m-1}\gamma(G)$, for $m \geq 3$. If true, this would be tight on certain infinite families of digraphs. Several partial results towards this conjecture will be surveyed. (Received September 20, 2007)