1118-05-236 **Monika M. Heinig*** (mheinig@stevens.edu), **Daniel Gross**, **John T. Saccoman** and **Charles Suffel**. *A polynomial time algorithm for computing neighbor component order edge connectivity of arbitrary unicycles.*

If a spy network is modeled as an undirected graph in which the nodes represent spies and the edges are the communication links between spies, then consider the scenario where the interception of a link compromises the identity of both endnode spies. In graph-theoretic terms, edges can fail but nodes cannot. When an edge fails, its endnodes are subverted, i.e., removed from the graph. Given a threshold value $k \geq 1$, the surviving subgraph produced by the failure of edges and the subversion of their endnodes is said to be in a failure state if all of its components have order $\leq k-1$. The minimum number of edge failures to yield a failure state is called the neighbor component order edge connectivity and is denoted $\lambda_{nc}^{(k)}$. It is the case that $\lambda_{nc}^{(1)}$ is the size of a minimum edge cover of the nodes and $\lambda_{nc}^{(2)}$ is the edge domination number. Thus, the complexity is polynomial for $k = 1$ but becomes NP hard when k is increased to 2. We present a polynomial time algorithm for determining the neighbor component order edge connectivity of arbitrary unicycles, which utilizes polynomial time algorithms for arbitrary trees, weighted paths, and weighted cycles. (Received February 01, 2016)