Some Results Related to the Tenacity Parameter in Networks

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Conceptually graph vulnerability relates to the study of graph intactness when some of its elements are removed. The motivation for studying vulnerability measures is derived from design and analysis of networks under hostile environment. Graph tenacity has been an active area of research since the the concept was introduced in 1992. Cozzens, Moazzami and Stueckle introduced two measures of network vulnerability termed the tenacity,T(G), and the Mix-tenacity, $T_m(G)$, of a graph.

The tenacity T(G) of a graph G is defined as

$$T(G) = \min_{A \subset V(G)} \{\frac{\mid A \mid + \tau(G - A)}{\omega(G - A)}\},$$

where $\tau(G - A)$ denotes the order (the number of vertices) of a largest component of $G - A$ and $\omega(G - A)$ is the number of components of $G - A$.

The Mix-tenacity T_m of a graph G is defined as

$$T_m = \min_{A \subset E(G)} \{\frac{\mid A \mid + \tau(G - A)}{\omega(G - A)}\}$$

where $\tau(G - A)$ denotes the order (the number of vertices) of a largest component of $G - A$ and $\omega(G - A)$ is the number of components of $G - A$.

In this talk we discuss tenacity and its properties in vulnerability calculation.