THE NSM OF A GRAPH

Dara Moazzami

Center for Theoretical Physics and Mathematics (AEOI)
and Shahid Beheshti University
Tehran, Iran

ABSTRACT

The purpose of this paper is to introduce a new invariant for measures of stability in networks. Since many network properties are actually properties of the underlying graph, we restrict this discussion to undirected graphs. We prove a number of basic results about this new parameter, including several relating it to other parameters of a graph, operations on graph, and Hamiltonian properties.

1 THE NEW STABILITY MEASURE OF A GRAPH (NSM)

The NSM of a graph $G$ is defined as $NSM(G) = \min\{\frac{|A|}{\omega(G-A)} \cdot \tau(G-A)\}$, where the minimum is taken over all cut-sets $A$ of $G$. A cutset of a connected graph is a collection of vertices whose removal results in a disconnected graph. For $G$, $\tau(G)$ is the number of vertices in a largest component of $G$ and $\omega(G)$ is the number of components of $G$. We see that $NSM(K_p) = p - 1$ for every $p \geq 1$. A set $A \subset V(G)$ is said to be a NSM-set of $G$ if $NSM(G) = \frac{|A|}{\omega(G-A)} \cdot \tau(G-A)$. Also note that if $G$ is disconnected the set $A$ may be empty.

Throughout this paper we will let $p$ and $q$ be the number of vertices and edges, respectively, of $G$ and we use $\beta(G)$ to denote the independence number of $G$. A graph $G$ with at least 3 vertices is called $n$-Hamiltonian for $0 \leq n \leq p - 3$, if the removal of any set of $k$ vertices from $G$, $0 \leq k \leq n$, results in a Hamiltonian graph. By the inflation $G^*$ of $G$ we mean the graph whose vertices are all ordered

C. J. Colbourn and E. S. Mahmoodian (eds.), Combinatorics Advances, 243–250.
REFERENCES


