

1084-05-32

**Xiaofeng Gu\*** (xgu@math.wvu.edu), Department of Mathematics, West Virginia University,  
Morgantown, WV 26506. *Characterizations of strength extremal graphs.*

With graphs considered as natural models for many network design problems, edge connectivity  $\kappa'(G)$  and maximum number of edge-disjoint spanning trees  $\tau(G)$  of a graph  $G$  have been used as measures for reliability and strength in communication networks modeled as graph  $G$ . Mader and Matula introduced the maximum subgraph edge connectivity  $\overline{\kappa'}(G) = \max\{\kappa'(H) : H \text{ is a subgraph of } G\}$ , and also considered  $\overline{\kappa'}(G)$  reflecting the strength of the graph  $G$ . Motivated by their many useful applications in network design and by the established inequalities

$$\overline{\kappa'}(G) \geq \kappa'(G) \geq \tau(G),$$

we in this paper present the following:

- (i) For each integer  $k > 0$ , a characterization for graphs  $G$  with the property that  $\overline{\kappa'}(G) \leq k$  but for any additional edge  $e$  not in  $G$ ,  $\overline{\kappa'}(G + e) \geq k + 1$ .
- (ii) For any integer  $n > 0$ , a characterization for graphs  $G$  with  $|V(G)| = n$  such that  $\kappa'(G) = \tau(G)$  with  $|E(G)|$  minimized. (Received August 08, 2012)