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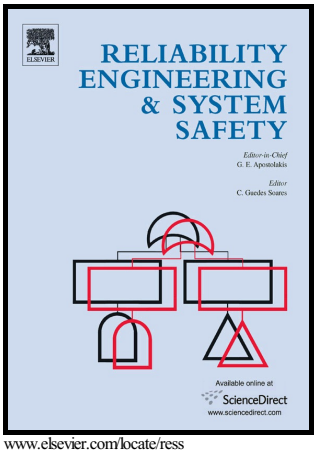
Yasser Almoghathawi, Kash Barker, Claudio M. Rocco, Charles D. Nicholson

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# A MULTI-CRITERIA DECISION ANALYSIS APPROACH FOR IMPORTANCE IDENTIFICATION AND RANKING OF NETWORK COMPONENTS

*Yasser Almoghathawi, Kash Barker, Claudio M. Rocco, Charles D. Nicholson*

Yasser Almoghathawi
Ph.D. student
School of Industrial and Systems Engineering
University of Oklahoma

Kash Barker, Ph.D.
Associate Professor
School of Industrial and Systems Engineering
University of Oklahoma

Claudio M. Rocco, Ph.D.
Professor
Universidad Central de Venezuela

Charles D. Nicholson, Ph.D.
Assistant Professor
School of Industrial and Systems Engineering
University of Oklahoma



## ABSTRACT

Analyzing network vulnerability is a key element of network planning in order to be prepared for any disruptive event that might impact the performance of the network. Hence, many importance measures have been proposed to identify the important components in a network with respect to vulnerability and rank them accordingly based on individual importance measure. However, in this paper, we propose a new approach to identify the most important network components based on multiple importance measures using a multi criteria decision making (MCDM) method, namely the technique for order performance by similarity to ideal solution (TOPSIS), able to take into account the preferences of decision-makers. We consider multiple edge-specific flow-based importance measures provided as the multiple criteria of a network where the alternatives are the edges. Accordingly, TOPSIS is used to rank the edges of the network based on their importance considering multiple different importance measures. The proposed approach is illustrated through different networks with different densities along with the effects of weighs.

## KEYWORDS

Network, vulnerability, flow, importance measures, MCDM, TOPSIS