

UNIVERSITI TEKNOLOGI MARA

**DYNAMIC AVAILABLE TRANSFER
CAPABILITY CALCULATION USING
RALSTON'S METHOD CONSIDERING
GENERATION RESCHEDULING**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

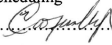
Faculty of Electrical Engineering

September 2012

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original work and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

The transition of a centralized monopoly towards a decentralized power system network creates a highly competitive electricity market in order to provide a safe, cheap, efficient and reliable electrical energy to consumers. In a decentralized power network system, the so-called available transfer capability (ATC) information plays an important role for a bidding process among market participants. The most challenging task in determining ATC is to compute it in a fast and accurate manner by taking into account different types of a system security. The first objective of the thesis is to propose a simple, fast and accurate approach based on the intersection point between the variations of system's constraint with respect to the increase of power transfer and the constraint's limit. Second objective is to propose an index namely as normalized participation factor for critical generator identification prior to undertaking a rescheduling procedure to any occurrence of small-signal instability during the transaction. The thesis also includes a detailed explanation on small-signal stability with the intention to facilitate the readers' understanding on power system dynamic as well as to clearly explain the ambiguous explanation on most of the power system books. The proposed techniques were performed on the 39-bus New England and 2737-bus Polish systems. The performance and effectiveness of the proposed techniques were evaluated through the comparison with recursive AC power flow solution and weighted-average sensitivity index, respectively. The results have shown that the proposed techniques are fast, accurate, reliable and robust in determining the maximum secure value of dynamic ATC.

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