

Critical lines identification for ATC assessment in power system planning

ABSTRACT

Ability to evaluate the accurate available transfer capability (ATC) has important impact on the trade of energy in power marketing. The impact of the transmission element status of transmission path has a possibility to severely change the statistics of the ATC. The impact of the line outage is more significant among the other component outages. The ATC assessment requires N-1 security assessment under line outages scenarios. Moreover, an efficient contingency ranking method to determine critical lines has significant impact on the ATC computational time. In this paper, MW loss, MVAR loss and Load Margin Index are described to find the critical lines for computing the ATC under contingencies. These methods are tested on IEEE 118 bus system and the ATC based on Krylov algebraic method are calculated for each critical line. Based on ATC results calculated from these contingency ranking methods, the efficiency of these methods compare together.

Keyword: Available transfer capability (ATC); Contingency evaluation; Critical line ranking; Line outage; Load margin index; MVAR loss; MW loss