ABSTRACT

The research described in this thesis is concerned with "Bulk Power System Reliability Evaluation".

A review of bulk power system reliability evaluation methods is presented and analysed. The five bulk load paints reliability indices (expected failure rate **l**, average outage duration r, expected annual outage time U, average load not supplied L and average energy not supplied E) are analysed and their importance is stressed. The thesis then discusses the total and partial loss of continuity failure events, The "PCAP" critical line contingency selection is discussed.

The thesis then presents a review of probabilistic models of generating units. A generation model suitable for bulk power system reliability evaluation, that considers the geographical location of the generating units is proposed.

After establishing the importance of the network elements for the evaluation of bulk load paints reliability indices an efficient algorithm using sensitivity coefficient to eliminate line overloads by generation redispatch and load shedding is presented.

Finally, computational techniques have bean developed in order to evaluate bulk load points reliability indices. The analysis of typical systems is also included in the thesis which illustrate the meaningful results that can be achieved, when comparing reinforcement or expansion schemes.