TRANSIENT STABILITY SOLUTION OF LARGE SCALE ELECTRIC POWER SYSTEM

Thesis is presented to fulfil the requirement of Advanced Diploma in Electrical Engineering of MARA Institute of Technology

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Contents   Page

Acknowledgement

Abstract

This project deal with the handling of the software for transient stability simulation using the CYME package. It was designed to run with personal computer to take advantage of the computational capability. The mathematical modeling and the analysis of the simulation program are based on numerical techniques of classical method for solving the system equations. Two power system network, the New England Network and Cigre System Network have been used in the simulation studies and the critical clearing time (CCT) for certain fault condition was determined. The factor that affect the stability for the system was also analyzed and determined.

Transient stability concerns itself with the matter of maintaining synchronism among all generators when the power system is suddenly subjected to severe disturbance such as faults or short circuit caused by lighting strikes, the sudden removal from the transmission network of a generator or tie line, or, in general, any severe shock to the system caused by switching operation. Because of the severity and suddenness of the disturbance, transient . stability analysis is focused on the first few seconds following the fault occurrence or switching mode. ·

Transient stability analysis is important factor in planning , design and operation of electrical power system because it require continuing and comprehensive analysis in order to determine system performance and to evaluate alternative system expansion plans. In depth analysis is necessary to determine the effectiveness of each alternative in alleviating operation problems and supplying load demands during normal and abnormal operating conditions, for peak and off-peak loading and for both present and future power system.

Present day transient stability analysis of a large scale power system is mainly performed by simulation. The use of the digital computer to perform all computation for both the network and the machines were a natural extension of the digital load flow studies that proved so successful. The performance of the power system during the transient period can be obtained from the network . performance equations. The performance equation using the bus frame of reference in either the impedance or admittance form has been used in transient stability calculations. In transient stability studies a load flow calculation is made first to obtain system conditions prior to the disturbance. In

1