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TITLE OF THE THESIS : **ELECTRIC POWER MANAGEMENT USING FACTS CONTROLLERS**

ABSTRACT

Electric Power System is a combination of Generation, Transmission and Distribution systems. It is exceptionally complex as far its management, construction and operation is concerned. In addition, due to the increased consumption of electric power and ascending electrical power demand, it becomes a cumbersome process of managing, monitoring and controlling electric power system. The proposed work is focused on the different techniques used for management of Electric power system. At the same time, the technical complexity of power transmission increases, with the introduction of new technologies in power system due to ascending nature of power demand and increasing geographical scope. In order to best meet the various demands for bulk power transmission, low cost power delivery and high reliability, there is introduction of power electronic–based system technology called FACTS (Flexible Alternating Current Transmission Systems). Different structures for power system organization are also being implemented in various parts of the world. This thesis will shed some light on the management of power transmission regarding the continued reliance on electrical power as a primary energy carrier.

Power System is always operated upon its rated capacity that sometimes results in loading of the transmission lines exceeding its thermal limits. Congestion occurs in transmission line due to lack of coordination between transmission and generation. Therefore Congestion management is necessary in order to relive the power system keeping in its secure state. The next objective is to reduce losses that have been caused by loading of transmission lines and improvement in the voltage profile by introducing FACTS devices. The results reveal that deployment of FACTS devices at their optimized location reduces the reactive power losses caused due to loadability. Another optimization technique Genetic Algorithm is used for the non linear program. GA is basically finding the optimal location for TCSC to reduce the losses in an overloaded system hence congestion is relieved. Introducing a hybrid scheme for congestion management and FTRs, facilitates the new restructured power system to deal with congestion charges and credits and helps in presenting a new approach for transmission pricing. LMP and FTR are the two techniques used for recovering fixed transmission costs and energy pricing. The scheme presented in this chapter combines best features of inter-zonal/intra-zonal scheme and FTR. A generalized mathematical model of FTR auction for maximizing revenues and availability to all parties on non-discriminatory basis to keep the system within limits has been developed .FTR congestion credits are calculated based on ALMP. The FTRs' allocation remains same until the participants compete in deregulated electricity markets for maximizing their total pay-offs. The transmission fees calculated by given strategy is interconnected with physical constraints and power flow in transmission lines. Thus, "willingness to pay to avoid curtailment" has become the main basis for rescheduling the schedule at the time of congestion and finding the conclude schedule after passing through SFT (Simultaneous Feasibility Test) analysis. Using this final schedule and LMPs, one can easily calculate transmission congestion and losses.