Optimal Placement of FACTS Controllers in Networks Using Genetic Algorithms for Optimizing Power System Loadability

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Abstract: All over world the economical growth and enhancement of the technological achievements initiates the electrical power system continuously expanding its size and enhancing its complexity in many aspects. Therefore the governments have been changing their rules and regulations by allowing the private sectors into the power generation, transmission and distribution called as Deregulated Power System. Flexible Alternating Current Transmission System (FACTS) is a technology introduced by Electrical Power Research Institute (EPRI) in the 1980. Various types of FACTS devices such as SVC, TCSC and UPFC etc, are used to control the power flow in the network. These increase the flow in heavily loaded lines, there by resulting in increase loadability, lowering system losses, improved stability of network and reduced cost of production [1]. FACTS technologies involve conversion and switching of power electronics in the range of a few tens few hundred megawatts. New solid state self commutating devices such as MOSFETs, IGBTs, GTOs and also other suitable power electronic devices are used as controlled switches in FACTS devices [2]. Although FACTS device has a great impact on power system for optimal power flow, but it requires optimal location for proper stabilization. For that reason, many researches were made on the optimal location of FACTS devices with many different ways. We use GA technique to search the optimal localization of FACTS devices in networks.

Keywords: FACTS, SVC, TCSC, UPFC, loadability, MOSFETs, IGBTs, GTOs, GA