

## Abstract

The continuing increase in electric energy consumption and transmission systems congestion in recent years has led to a decrease in network controllability and reliability. In this regard finding proper solutions has always been a challenging issue. Building new lines is less considered for high expenses and long construction time. A good strategy is an efficient and thorough utilization of existing power line capacities. In this respect FACTS (Flexible AC Transmission System) controllers are introduced as a proper solution. In this thesis the new developed type of such compensators called DSSC (Distributed Static Series Compensator) with the purpose of solving some previous problems is first introduced. A suitable model for DSSC in MATLAB is then proposed for using in compensating systems. DSSC compensating system impacts on system parameters and differences in various implementation of a same compensation is covered thereafter. Also the important part of the line current and power control by DSSC units and the ability of such system in a desired controlling technique will be analyzed. Finally a simple model for DSSC in Newton power flow will be proposed.

**Keywords:** FACTS Controllers, DSSC compensation, Line current and power control.



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**Technical Analysis and Study of Applications of Series  
Distributed FACTS Devices in Power Transmission  
Systems**

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