Abstract

The control of power and the usable capacity enhancement of present as well as new and upgraded lines can be effectively done by Flexible alternating current transmission systems (FACTS) technology. The Unified Power Flow Controller (UPFC) is a second generation FACTS device which enables independent control of active and reactive power besides improving...
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reliability and quality of the supply. This paper describes the independent control of real and reactive power flow through a transmission line by using the d-q (direct axis-quadrature axis) control strategy for UPFC placed at the sending end of an electrical power transmission system. The d-q control scheme is based on the transformation of a three-phase system to d-q two axis system. The power flow control performance of the d-q control scheme based UPFC is compared with that of the other FACTS device called Static Synchronous Series Compensator (SSSC) by applying a single line-to-ground fault across a transmission line to which they are connected. Simulations are carried out in Matlab/Simulink environment to validate the performance of the d-q control scheme for UPFC. The simulation results show that the d-q control scheme based UPFC is more effective than SSSC in controlling the real and reactive power flow.

Reference

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**Index Terms**

Computer Science  
Control Systems

**Key words**

FACTS  
Matlab/Simulink  
Real and reactive  
power flow  
SSSC  
UPFC