Abstract

The Unified Power Flow Controller, UPFC is one of the most important FACTS devices since it can provide various types of compensation (all types of compensation achievable prior to its conception simultaneously or selectively, hence its name). In this paper, the Unified Power Flow controller has been analyzed and simulated. The analysis is a mathematical model based on the power injection model. The simulation, carried out using PSCAD (Power System Computer Aided Design) was used to determine the effects of the use of the UPFC on an existing transmission line, examining the various benefits proposed by its use, illustrated by suitable graphs. This paper proposes a case study to control the power flow of a power system with UPFC. In this study, I am considering a standard 5-bus network for the analysis. Power
flow equations are solved using Newton Raphson's algorithm and the simulations of the algorithm are done in MATLAB. The results of the network with and without UPFC are compared in terms of active and reactive power flow in the transmission line at the bus to analyze the performance of UPFC. Objective of the whole work is to control the power flow in the transmission line. This can be achieved by knowing the various parameters which are involved in power flow in the transmission line.

References

- Jinfu Chen, Xinghua Wang, Xianzhong Duan, Daguang Wang, Ronglin Zhang, "Application of FACTS Devices for the Interconnected Line Between Fujian Network and Huadong Network"; IEEE.
- M. P. Bahman, P. E. , "HVDC Transmission Overview"; IEEE.
- Rajiv K. Varma, "Introduction to FACTS Controllers"; Member, IEEE.
- M. Noroozian, C. W. Taylor, "Benefits of SVC and STATCOM for Electric Utility Application".

Index Terms

Computer Science
Control Systems
Keywords

Facts  Power System  Stability  Sssc- Static Synchronous Series Controller  Statcom - Static Synchronous Compensator

Upfc – Unified Power Flow Controller.