



Role of Unified Power Flow Control in Voltage Power Transfer : A Critical Study

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Abstract-The unified power flow controller (UNIFIED POWER FLOW CONTROL) is being used as a compensating and power control device in the power systems due to its easy build, high robustness and efficiency. Simulation results reveal that as far as voltage sag and swell are concerned both the two-level and five level inverter based UNIFIED POWER FLOW CONTROL exhibit the similar performance. As the five level inverter based UNIFIED POWER FLOW CONTROL generates nearly sinusoidal load voltage, its THD is observed to be 3.15%. It is 15.65% in the case of its two level counterparts. It may be noted that for power of good quality the THD must be less than or equal to 5% as per standards. Hence, with respect to power quality, the five level UNIFIED POWER FLOW CONTROL scheme has an edge over two level UNIFIED POWER FLOW CONTROL scheme.

Introduction

Fewer natural resources and ever increasing demand has set the stage for unprecedented changes and new regulations. In this restructured and deregulated power system environment, added problem is restriction building new transmission lines and generating plants. Therefore the thrust has shifted to

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maximize available transmission facilities. Unregulated active and reactive power flows may result in loss of power system stability, high transmission losses, voltage collapse etc. Power flow generally in the low impedance path, there by overloading that line and restricting UPFC with minimum losses and low storage capacity at unity or higher voltage transfer ratio. This research work proposes a unique converter structure using Z Source Impedance coupled to Bridge Configured Matrix Converter based unified power flow controller not dealt with so far. The UPFC is capable of integrating all conventional transmission control concepts i.e. series compensation, phase shifting, and voltage regulation into a generalized power flow controller. As a dynamic real and reactive power flow controller with operations under power system oscillations and transmission line faults it is competent of enhance the transfer capability of the transmission line beyond imagination. Extensive researches continue to contribute on different structures and converter configurations of