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A Review on Improving the Voltage Profile and the Line Power Flows in Various Controlling System by UPFC

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***Abstract*: The continued fast development of high-voltage semiconductor technology currently makes it potential to regulate power systems by means of power electronic devices. These devices represent associate degree rising technology known as FACTS (flexible alternating current transmission systems). The UPFC is that the most versatile of the FACTS devices. It cannot exclusively execute the functions of the fixed synchronous compensator (STATCOM), thyristor switched capacitor (TSC) thyristor controlled reactor (TCR), and also the phase position controller though also provides extra flexibility by combining a number of the functions of the higher than controllers.**

***Keywords*: FACTS, TSC, DPC, TCR, UPFC.**

1. Introduction

The ever-increasing complexity of enormous interrelated networks had fluctuations in uniformity of power supply, which resulted within system unsteadiness, not simple to adjust the power flow and security procedures issues that resulted large number blackouts in several elements of the world. The explanation in the rear the above fault sequences are moreover due to the systematical errors in designing and operation, fragile interconnection of the power system, lack of preservation or owing to burden of the network. In order to beat these consequences and to supply the required power flow in conjunction with system stability and reliability, installations of new transmission lines are needed. However, installation of new transmission lines with the large interconnected power grid are restricted to a number of the factors like economic price, setting connected problems. These complexities in putting in new lines in an exceedingly facility challenges the power engineers to analysis on the ways that to extend the ability flow with the present transmission line while not reduction in system stability and security.

2. Literature review

[Silva, J.F. ; Pinto, S.F. ; Palma, J.(2009) This paper shows the *direct power* control of *three*-phase matrix converters (DPC-MC) operating as unified power flow controllers (*UPFC*). *Matrix converters* permit to *direct* ac/ac conversion without midway energy storage space link; the resultant *UPFC* has reduced quantity and outlay, along with superior consistency. Actual principles of DPC-MC method are based on an *UPFC* model, together with a new *direct power* control approach based on sliding mode control techniques.

Radan, A.; Haghshenas, Mehdi (2010)**,** This paper is describing the application of multi frequency proportional-resonant (MFPR) controller for an imc current control. It is shown that the known shortcomings associated with pi controllers, the need for decoupling of three-phase system and input power factor correction can be alleviated.

Silva, J.F. ; Pinto, S.F. ; Palma, J. (2011) This paper presents a direct power control (DPC) for three-phase matrix converters operating as unified power flow controllers (UPFCS).In this Matrix converters (MCS) allow the direct ac/ac power conversion without dc energy storage links; therefore. Theoretically direct power control (DPC) based on sliding mode control techniques are established for an MC-UPFC dynamic model including the input filter.

Silva, J.F.; Pinto, S.F. J. (2014), This paper compares the performance of linear, decoupled and direct power controllers (DPC)forthreephasematrixconvertersworkingasunifiedpowerfl owcontrollers (UPFC). A steady-state model of the matrix converter-based UPFC fitted with a modified venturing high-frequency pulse width modulator is used to design the linear controllers for the transmission line active (p) and reactive (q) powers. To minimize the resulting cross coupling between p and q power controllers, decoupled linear controllers (DLC) are synthesized using inverse dynamics linearization.

3. Problem formulation

The unbalanced condition or transient condition might results in instability wherever the machines within the grid fall out of synchronism. Calculation of load flow equation by Newton-Raphson methodology, Runga-kutta methodology, and decoupled methodology offers the rotor angle and initial condition. To optimize the cost and best possible use of line recompense is necessary, which strength either; compensate the voltage, part shift, or each the increase of voltage and part shift, and real and reactive power improvement.

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4. Proposed Methodology

A. Experiment methodology

It is observed from the critical review of literature so as to an extensive investigate work had been approved out in the methodology of these type of devices for optimal power run study and control investigation. Though, a lot concentration has not been focused on the growth of power electronic based converter circuits and their control in reverence of total harmonic distortion (THD).

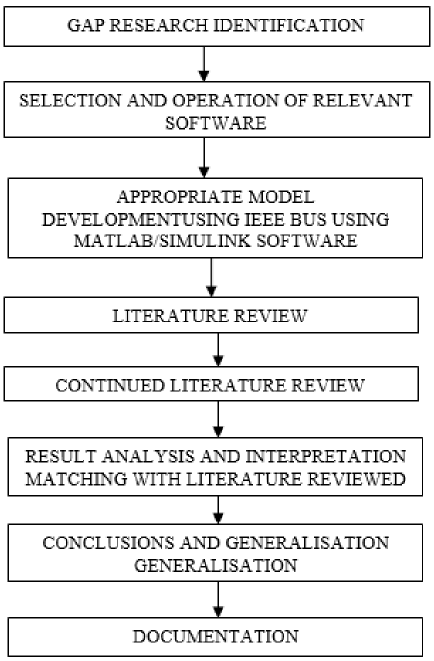

Fig. 1. Flowchart for Research

B. Technology considered

Though the proposed scheme of UPFC without dc link capacitor achieve analogous to the presented system of UPFC a strident dc linkage presentation is observed owing to be deficient in of dc capacitor. To overcome this limitation, a matrix converter is employed in UPFC whereby the classical Matrix converters which have an array of nine bidirectional switches are found to be more consistent and possible enough to have a lot longer life, since of the lack of the dc link capacitor. In addition, it has a number of recompense such as single stage switch over, bidirectional power flow, less number of switches and guarantees input and output sinusoidal voltages and currents with condensed THD. The indirect space vector modulation technique has been used to control the matrix converter present in the UNIFIED POWER FLOW CONTROLLER. The ISVM algorithm for the matrix converters has the inherent capability of controlling at the same time both the output voltage and the instant input current dislocation angle.

5. Conclusion

The method is discussed part by part, starting with demonstrate the multiple functionality of UFPC in improving the voltage profile and the line power flows. Operation in reactive power control mode, reactive power injections by the STATCOM in capacitive mode, operation in automatic power flow control mode, SSSC injected voltage and transmission line current, real and reactive power flow.

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