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ACTIVE POWER CONTROL IN TRANSMISSION LINE BY USING UPFC

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ABSTRACT
The Unified Power Flow Controller (UPFC) is a second generation FACTS device which enables independent control of active and reactive power besides improving reliability and quality of the supply. The real and reactive power flow control through a transmission line by placing the UPFC at the sending end of an electrical power transmission system. By providing added flexibility, FACTS controllers can enable a line to carry power closer to its thermal rating.

KEYWORDS*:* Voltage source inverter, PWM generator, Micro Controller, Triac, MOSFET.

1. INTRODUCTION

In recent years, greater demand have been placed on the transmission network, and these demands will continue to increase because of the increasing number of non utility generators and heightened competition among utilities themselves. It may lead to large power flows with inadequate control excessive reactive power in various parts of the system, large dynamic swings between different parts of the system.

In recent years, major changes have been introduced into the structure of electric power utilities all over the world. The power industry has responded to the challenges with the technology of FACTS. This term a whole family of power electronic controllers, some of which may have achieved within the industry.

2. TRANSMISSION LINE MODEL

A lab model single phase supply of 230 volt, 60 watt power, current 0.2 ampere medium transmission line created by using the reference values. The distributed values of transmission line resistance, inductance and capacitance in lumped form the resistance is low there're for internal resistance of inductor is taken into consideration instead of separate resistance. The model is also useful in the different effect on the transmission line like Ferranti effect etc. Also various power system experiments can be carried out like power factor improvement and FACTS practical.

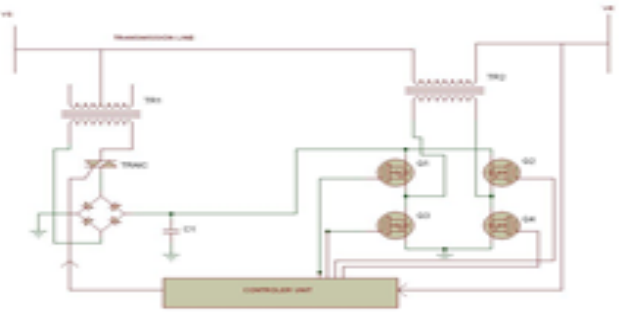
3. UPFC

The UPFC is made out by two voltage source converter with semi-conductor device having turn off capability sharing a common DC capacitor and connected to a power supply through coupling transformer. The shunt converter is primarily use to provide the real power demand of series converter at the common

DC link terminal from the ac power supply converter two provides the main function of the upfc by injecting a voltage Vpq with controllable magnitude Vpq and phase in series with the line and insertion transformer. This injected voltage acts essentially as a synchronous ac voltage source. The transmission line current flows through this voltage source resulting in reactive and real power exchange between it and the ac system.

The basic function of converter 1 is to supply or absorb the real power demanded by converter 2 at the common DC link to support real power exchange resulting from the series voltage. This DC link power demand of converter 2 is converted back to ac by converter 1 and couple you transmission line bus via shunt connected transformer. In additional to the real power need of converter 2, converter 1 can also generate or absorb controllable reactive power if it is desired, and thereby provide independent shunt reactive compensation for the line.

Also we use converter 1 as diode for rectification that is converting ac to dc supply and converter 2 used as mosfet for converting dc to ac supply.



4. DESIGN REQUIREMENTS

1.TEST PERFORMED WITHOUT UPFC

The transmission line then tested on behalf of different loading conditions. The lamp load is taken as the resistive load as the load increases varies effects on transmission line parameter are observed and taken into calculations. The Ferranti effect is observed on no load and lightly loaded condition. Whether decreases in R.E voltage is observed on heavily loaded.

Table

Sr No	Input voltage	Output voltage	Load
1	230	290	No load
2	230	270	15
3	230	245	30
4	230	217	45
5	230	190	60

2.TEST PERFORMED WITH UPFC

Sr No	Input voltage	Output voltage	Load
1	230	230	No load
2	230	230	15
3	230	230	30
4	230	230	45
5	230	230	60

5. MICRO CONTROLLER

A micro controller contains one or more CPU (processor cores) along with memory and programmable input/output peripherals. Program memory in the form of ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Micro controllers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips.

Some micro controllers may use four-bit words and operate at frequencies as low as 4 kHz, for low power consumption (single-digit milliwatts or micro watts). They will generally have the ability to retain functionality while waiting for an event such as a button press or other interrupt; power consumption while sleeping (CPU clock and most peripherals off) may be just nanowatts, making many of them well suited for long lasting battery applications. Other micro controllers may serve performance-critical roles, where they may need to act more like a digital signal processor (DSP), with higher clock speeds and power consumption.

6. CONCULSION

In this study, a brief review of UPFC (FACTS), the essential features of UPFC controller was discussed .the potential to enhancement of power system stability was explained. In power system transmission, it is required to maintain the voltage magnitude, phase angle and line impedance. Consequently, to control power flow over designated transmission line and enhancement of power system stability FACTS devices are used in modern power system network. In this paper the role of UPFC device in power system and current status of electric power system network are addressed. Therefore, following results are found power flow control is achieved by using FACTS (UPFC) devices. Transient stability is improved and faster steady state is achieved. Hence congestion is less by improving transient stability.

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