IMPROVISED MECHANISM FOR STABILITY OF POWER SYSTEM USING SOLID STATE DEVICE: A REVIEW

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A classical multi-machine model can be used to study the stability of a steering system during a period of time during which the dynamic response of the system depends to a large extent on the kinetic energy of the periodic masses. The classic system of nine buses of three machines [1] is the simplest model used in studies of system dynamics and requires small amounts of data. Therefore, these studies can be linked in a relatively short time at the lowest possible cost. Among the various methods to calculate the flow of pregnancy, the Newton Ravenson method is selected to calculate the pregnancy flow study.

I. INTRODUCTION

UPFC is the most versatile of the FACTS devices. It can only perform static static compensatory functions (STATCOM), controlled thyristors (TSC) with commutated thyristors (TCR) and phase regulator angles, but also provides additional flexibility in the reactor mix. Some previous functions [17] the actual power flow it is reactivated by injecting the voltage into the chain with the transmission line. Both the angle and the phase angle of the voltage can be changed independently. It can control the actual power flow and the interaction allows the flow of energy in specific routes, transmission lines and load closer to its thermal limits It can be used to improve the stability of the transient and small signal of the power system. The UPFC scheme appears in Figure 1.1.

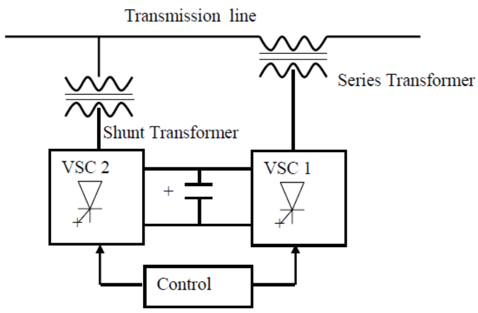

Fig.1.1. Schematic diagram of UPFC

UPFC consists of two branches. The chain branch consists of a voltage source transformer, which injects voltages into a series through an adapter. The inverter is connected to the UPFC input terminal by bypassing the AC supply system and the inverter is connected to the UPFC input terminal in a series with the AC power circuit. Since the UPFC series branch can inject variable voltage and phase angle, it can exchange real energy with the transmission line. However, the UPFC as a whole cannot supply or absorb real energy in a stable state (except for the energy consumed to compensate for losses) unless it has a DC power source.

II. LITERATURE RIVIEW

In recent years, energy, environmental, road and cost problems have delayed the construction of new generation facilities and transmission lines, while demand for electricity has continued to grow. This situation requires a review of traditional energy system concepts and practices to achieve greater operational flexibility and better use of existing energy systems [7-10]. Over the past two decades, significant, if not revolutionary, progress has been made in high-power semiconductor devices and control techniques [28, 29, 34, 35]. These techniques have been essential in the wide application of the transition to inertia systems of the high voltage electric power system and already have a significant impact on AC transmission through the increased use of fixed-frequency VAR controlled by the thyristor (SVC). The fixed VAR processors control only one of three important parameters (voltage, impedance, and phase angle) that determines the power flow in AC power systems: the voltage capacity at the terminals specified for the transmission line. The theoretical considerations and recent studies of the system [1] suggest that the high use of a complex and interconnected AC system that achieves the desired objectives of availability and operational flexibility may also require real-time control of line resistance and phase angle. Hingorani [17] proposed the concept of AC flexible transmission systems or FACTS, which includes the use of high-power electronics, advanced control centers and communication links, to increase the transferability of usable energy to its limits. In the framework of FACTS, and other efforts with similar objectives, the development of a series of thyristor-controlled compensators to control linear impedance, thyristor-controlled tap switches to phase control and other thyristor-controlled devices have already begun dynamic "brakes" and capacitors [3] , 4] or are expected to begin in the near future. Although the current VAR and other current thyristor control equipment developed for power flow control (i.e. phase and serial conversion equations) may have the speed needed to control real time, they are very large and custom-designed systems made of large costs, which Requires great installation with important manpower installation [24-29]. For these reasons, they are unlikely to be able to provide an economic solution based on long-term volume production of flexible AC transmission systems. It is long known that the Vair is fixed or advanced, which is the true equivalent of a perfect synchronous condenser, technically feasible [5-8], and with the use of gate closure (GTO). Thyristor [10, 31], economically viable [17]. A recent extension of this approach has been proposed to compensate the controllable series and change the stage [5]. But other FACTs with the therstorization process provide

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only limited control [20-26]. Therefore, UPFC is the most versatile FACT device, which can provide different types of control, such as voltage compensation, phase change, real and interactive power compensation. Then, when using UPFC, the transient stability of the power system is improved by placing it on the bus power system. The simplified system design, reduce the size of the equipment and facility workmanship, improve performance and significantly lower the cost of capital, driven by advances in semiconductor power technology.

III. MOTIVATION OF THE PRESENT WORK

Trans-transition stability is an important area of research for several decades. Transient stability returns the system after the fault is removed. Any imbalance between the generation and the pregnancy begins with a transient making synchronous machine rotors "oscillating" because they exert pairs of net acceleration on these rotors. If this net torque is large enough to make some rotors swing enough to one or more of the "sliding pole" machines and lost synchronization. Then the calculation of temporary stability must be necessary. Load flow analysis of the system is required. Temporary stability should be improved to improve system load capacity, as the system can be mounted near its thermal limits. UPFC is a device that provides both string and offset compensation. It also improves the real and interactive capability of the system.

3.1 PROBLEM STATEMENT

An error can cause instability in the system or the device may lose synchronization. A pregnancy flow study should be conducted to analyze the temporal stability of the energy system. If the system cannot continue until the error is cleared, the error can lead to the stability of the entire system. If oscillation in the rotor angle continues around the end position of the increase and the change in angular velocity continues during the temporary increase, the system will never reach its final position. An unbalanced state or transient state can cause instability as the devices fail in the power system. The calculation of the Newton Raafson load flow equation, the rungeekutta method and the discrete method give the spin angle and the initial state. It is necessary to improve the cost and optimize use of the transmission line offset, which can compensate for the voltage, phase change or both, increase voltage and phase change, and improve real and interactive power. Before inserting the static power electronics, constant capacitors, inductors, etc. are used. To make up for control that cannot be done. Then, after the introduction of FACT devices, they give control of compensation. FACT devices such as STATCOM, SVC, etc. They only give compensation derivation. Therefore, a control device that can provide serial and bypass compensation must be used, and its transient stability must be increased so that the load of the transmission line is closer to its thermal limit.

IV. CONTROL STRATEGY OF UPFC

4.1. Control Strategy

The main function of UPFC is to control the flow of real and reactive power by injection of a voltage in series with the transmission line. The schematic of UPFC is shown in Fig 4.1 .The UPFC consists of two branches .The series branch of the UPFC can inject a voltage with variable magnitude and phase angle, and the shunt branch is required to compensate(from the system) for any real power drawn , supplied by the series branch and the losses.

$$\Re(\overline{V}^{u1}\overline{I}_1^* + \overline{V}^{u2}\overline{I}_2^*) - P_{loss} = 0 \qquad (4.1)$$

It is this context that suitable control strategies and control design to achieve the same ease of importance. The control strategies should have the following attributes:

1. Steady state objective should readily achievable by setting the references of the controllers.
2. Dynamic and transient stability improvements.

The UPFC allows us three "degrees of freedom"

1. Magnitude and angle of series voltage
2. Shunt reactive current.

The real and reactive power flow in the line can be con-trolled independently using the series injected voltage [29-31]. It should be noted that the UPFC uses Voltage Source Converters (VSCs) for series voltage injection as well as shunt current control. The injection of series voltage can respond almost instantaneously to an order. The shunt current, however, is controlled indirectly by varying the shunt converter voltage (closed loop control of shunt cur-rent is required).

4.1.1 Series injected voltage control

To achieve real and reactive power flow control we need to inject series voltage of the appropriate magnitude and angle. The injected voltage can be split into two components which are in phase ("real voltage") and in quadrature ("reactive voltage") with the line current. It is to be noted that the line current measurement is locally available. The real power can be effectively controlled by varying the series reactance of the line. Reactive voltage injection is like series insertion of reactance except that the injected voltage can be

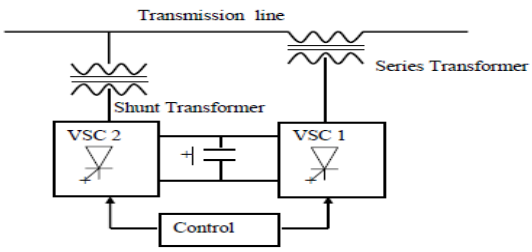

Fig.4.1Unified Power Flow Controller (UPFC)

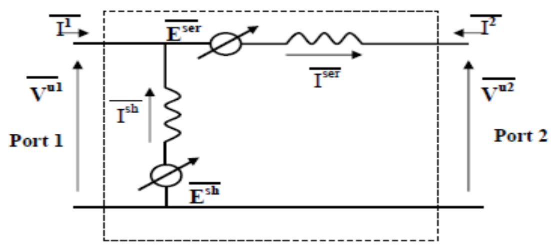

Fig.4.2 UPFC as a two-port device

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Independent of the transmission line current. Thus we control active power flow using the reactive voltage. It should be kept in mind that real and reactive power references are obtained from (steady state) power flow requirements. The real power reference can also be modulated to improve damping and transient stability.

In addition, reactive power can be controlled to prevent dynamic over/under voltages. In fact, instead of having closed loop control of reactive power using the voltage, the voltage at port 2 (see Fig.4.2) of the UPFC can be controlled readily by calculating the required real voltage to be injected. We can control reactive power in-directly by changing the voltage reference for port 2.

4.1.2 Shunt current control

It is well known that shunt reactive power injection can be used to control bus voltage. Thus the shunt current is split into real (in phase with bus voltage) and reactive current components. The reference value for the real current is set so that the capacitor voltage is regulated (which implies power balance). The reactive current reference is set by a bus voltage magnitude regulator (for port 1 of the UPFC).The voltage reference of the voltage regulator itself can be varied (slowly) so as to meet steady state reactive power requirements

V. EXPECTED OUTCOME

The classic system of nine buses of three machines is the simplest model used in studies of system dynamics and requires small amounts of data. Therefore, these studies can be linked in a relatively short time at the lowest possible cost. Among the various methods to calculate the flow of pregnancy, the Newton Ravenson method is selected to calculate the pregnancy flow study.

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