1. **Title:** Transient Stability Analysis of SMIB System Equipped with Hybrid Power Flow Controller

**Abstract:** Recently, a novel Hybrid Power Flow Controller (HPFC) topology for FACTS was proposed. The key benefit of the new topology is that it fully utilizes existing equipment. The MATLAB/SIMULINK models of three different configurations of HPFC have been investigated for their different characteristics, by incorporating them in the SMIB system. In all the three cases, the steady state stable values of rotor-angle, time taken to attain stability, maximum overshoot and the rise-time by varying the FCT, and also by varying the damping constants, have been found out. Any of these configurations can effectively be incorporated in a SMIB system and contributes highly in the transient stability enhancement of the system.

2. **Title:** Transient Stability Analysis of Multi-Machine System Equipped with Hybrid Power Flow Controller

**Abstract:** Recently, a novel hybrid power flow controller (HPFC) topology for FACTS was proposed. The key benefit of the new topology is that it fully utilizes existing equipment. The MATLAB/SIMULINK models of three different configurations of HPFC have been investigated for their different characteristics, by incorporating them in the MM system. In all the three cases, the steady state stable values, time taken to attain stability, maximum overshoot and the rise-time of relative angular positions delt 1-2, delt 2-3 and delt 3-1 have been found out by varying the FCT, and also by varying the damping constants. Any of these configurations can effectively be incorporated in a MM system and contributes highly in the transient stability enhancement of the system.
3. Title: LabVIEW based Simulation of SSSC for Transient Stability Enhancement in Electric Power Systems

Abstract: Static Synchronous Series Compensator (SSSC), as its name says, is a series connected device which can provide controllable compensating voltage over a capacitive and inductive range independent of the magnitude of line current. In the present work the authors have made an attempt to simulate SSSC in terms of transfer function models. These simulated models have been tested by incorporating them in a simple single-machine infinite-bus (SMIB) system as well as in a multi-machine power system. LabVIEW software has been employed for the simulation purpose. This simulation technique also reduces the system complexity from a developer’s standpoint, and thus allows the researchers to concentrate on the application details. Such facilities are not available in the traditional means of measurement techniques and tools. Simulation results are encouraging and indicate that the proposed simulation model is very close to the physical simulation.

4. Title: Transient Stability Analysis of Electrical Power Systems by means of LabVIEW based Simulation of STATCOM

Abstract: Transient stability is the capability of the power system to maintain synchronism under the condition of a severe and fast disturbance in the system. Flexible AC Transmission System (FACTS) devices are used to control power flow along transmission lines and improve power system stability. Static Synchronous Compensator (STATCOM) is one of the second generation FACTS devices that are usually used for voltage regulation. It so also used to improve power system stability by injecting or absorbing reactive power. In the present work the authors have made an attempt to simulate STATCOM in terms of transfer function models. These simulated models have been tested by incorporating them in a simple single-machine infinite-bus (SMIB) system as well as in a multi-machine power system. LabVIEW software has been employed for the simulation purpose. LabVIEW is a new research tool which is capable of representing dynamic systems in block diagram form, along with the provision of simulation of the system behavior in
totality. This simulation technique also reduces the system complexity from a developer’s standpoint, and thus allows the researchers to concentrate on the application details. Such facilities are not available in the traditional means of measurement techniques and tools. Simulation results are encouraging and indicate that the proposed simulation model is very close to the physical simulation.

5. Title: LabVIEW based Simulation of UPFC in Single Machine Infinite Bus (SMIB) System

Abstract: A number of Flexible AC Transmission System (FACTS) controllers based on the rapid development of high power electronics technology have been proposed in recent years for better utilization of existing transmission facilities. FACTS devices have shown very encouraging results for improvement of power system steady state performance. Unified Power Flow Controller (UPFC) is a versatile FACTS device which has the ability to adjust the three control parameters, i.e. the bus voltage, the transmission line reactance, and the phase-angle between two buses. During transients, it can be used to improve the damping rate of low frequency oscillations. Single Machine Infinite Bus (SMIB) electrical power system incorporated with UPFC has been simulated in the present work with the aim of analyzing the response of the device for enhancing transient stability of the electrical power system. LabVIEW tool has been used for the simulation purposes. LabVIEW is a new research tool which is capable of representing dynamic systems in block diagram form, along with a provision of simulation of system behavior in total. Results obtained are encouraging and indicate that the proposed simulation model is very near to the physical simulation.

6. Title: LabVIEW based Simulation of Multi-Machine System Incorporated with SVC

Abstract: Power system engineers are currently facing challenges to increase the power transfer capabilities of existing transmission system. FACTS controllers can improve the stability of an electrical power system by helping critically disturbed generators to give away the excess energy gained through
the acceleration during fault. SVC is used as shunt controller in transmission system and can be designed to control the reactive power flow by operating in both capacitive and inductive regions to increase the total power capacity or to improve the transient stability. In the present work the author envisages to make an attempt to simulate a Multi-Machine system incorporated with SVC Controller by making use of LabVIEW.

7. **Title:** Simulation of Static VAR Compensator (SVC) incorporated in a Single Machine Infinite Bus (SMIB) System using LabVIEW

**Abstract:** Flexible AC Transmission System (FACTS) controllers are capable of power flow balancing and thereby using the existing power system network most efficiently. FACTS controllers by virtue of their fast response can improve the stability of an electrical power system by way of helping critically disturbed generators to give away the excess energy gained through acceleration due to a fault or disturbance. Static VAR Compensator (SVC) is a key shunt connected FACTS controller and is widely recognized. It serves as an effective means to enhance power system stability. In the present work the authors have made an attempt to simulate the SVC by incorporating LabVIEW for a Single-Machine-Infinite Bus System (SMIB). Main aim of the present work is to analyze the response of an SVC controller in a Single-Machine-Infinite Bus System by simulating it in LabVIEW. LabVIEW is a new research tool which is capable of representing dynamic systems in block diagram form, along with a provision of simulation of the system behaviour in total. This also reduces system complexity from a developer's standpoint, and thus, allows concentrating on the application details. These facilities are not available in the traditional means of measurement techniques and tools. Results obtained are encouraging and indicate that the proposed simulation model is very near to the physical simulation.

8. **Title:** LabVIEW based Simulation of TCSC FACTS Controller

**Abstract:** Power is an essential requirement of our life. The demand of power in India is enormous and is growing steadily. However because of lack of available investments, the development of new transmission systems in the
country does not follow the increase in power demand. Power system engineers are currently facing challenges to increase the power transfer capabilities of existing transmission systems. As such it is necessary to utilize the existing power transmission system at its maximum capacity to meet increasing demand of electrical energy. Flexible AC Transmission System (FACTS) controllers are capable of power flow balancing and thereby using the existing power system network most efficiently. FACTS controllers by virtue of their fast response can improve the stability of an electrical power system by way of helping critically disturbed generators to give away the excess energy gained through acceleration due to a fault or disturbance. Static VAR Compensator (SVC) is a key shunt connected FACTS controller and is widely recognized. It serves as an effective means to enhance power system stability. In the present work the authors have made an attempt to simulate the SVC by incorporating LabVIEW for a Single-Machine-Infinite Bus System (SMIB). Main aim of the present work is to analyze the response of an SVC controller in a Single-Machine-Infinite Bus System by simulating it in LabVIEW. LabVIEW is a new research tool which is capable of representing dynamic systems in block diagram form, along with a provision of simulation of the system behavior in total. This also reduces system complexity from a developer's standpoint, and thus, allows concentrating on the application details. These facilities are not available in the traditional means of measurement techniques and tools. Results obtained are encouraging and indicate that the proposed simulation model is very near to the physical simulation.