CERTIFICATE

It is certified that the project entitled "**Load Flow of Inter-Connected Power System Including FACT Controller**" being submitted by, **Amita Kumari Sharma** M.Tech in Power System, **Delhi Technological University,** is a record of original bonafide work carried out by his under my guidance and supervision. The results in this project have not been submitted in part or full to any other university or institute for award of any degree or diploma.

I wish his success in all his endeavours**.**

Dr. Narendra Kumar
Professor & Head of
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LIST OF SYMBOLS

P_p	real power component for any bus p
Q_p	reactive power component for any bus p
Y	bus admittance matrix
J	jacobian matrix
e_p	real part of voltage at any bus p
f_p	imaginary part of voltage at any bus p
δ	load angle
PEx	power exchange
V_{sp}	specified voltage
R	transmission line resistance
X	transmission line reactance
G	transmission line conductance
B	transmission line susceptance
VM	nodal voltage magnitude
VA	nodal voltage phase angle
Qmax	generator reactive power upper limit
Qmin	generator reactive power lower limit
PGEN	scheduled active power contributed by the generator
QGEN	scheduled reactive power contributed by the generator
PLOAD	scheduled active power consumed at the bus
QLOAD	scheduled reactive power consumed at the bus

ABSTRACT

The demand of the electrical energy is ever increasing and it is desired to use the existing transmission network to its thermal stability limits. The transmission capacity can be increased by the compensation at appropriate locations.

The reactive power compensation plays an important role in the planning of power system. This ensures a satisfactory voltage profile and a reduction in power and energy losses within the system. Reactive power also maximizes the real power transmission capability of transmission lines, while minimizing the cost of compensation.

In this thesis, the reactive compensation of power system is attempted using the STATCOM. The effect of these devices on power flows and bus voltage profile has been studied by placing at random location. STATCOM is used to compensate reactive power and thus to maintain voltage magnitude at 1 p.u. Reactive power compensation is an important issue in powers system. The purpose of reactive power compensation is mainly to improve the voltage profile in the system and to minimize the power loss.

This thesis contains load flow in 5-bus, IEEE-14 bus and IEEE-30 bus test system with and without using the STATCOM. Load flow in all the three test systems is done using Newton - Raphson Method.

Data for the load flow analysis of five bus system and STATCOM data have been taken from "FACTS Modelling and Simulation in Power Networks" by Enrique Acha.

For Load Flow analysis of IEEE-14 bus system data have been taken from online resources of Washington University.

For Load Flow analysis of IEEE-30 bus system data have been taken from "Power System Analysis" by Hadi Saadat.

Software used: MATLAB 7.6.0