

**POWER QUALITY IMPROVEMENT IN DISTRIBUTION NETWORKS
USING DSTATCOM**

*Thesis submitted in partial fulfillment of the requirements for the award of
degree of*

**MASTER OF ENGINEERING
IN
POWER SYSTEMS & ELECTRIC DRIVES**



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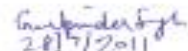
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CERTIFICATE

I hereby certify that the work which is being presented in this thesis entitled "Power Quality Improvement in Distribution Networks Using DSTATCOM" in partial fulfillment of requirement for the award of the M.E. in POWER SYSTEMS AND ELECTRIC DRIVES submitted in the Electrical and Instrumentation Engineering Department, Thapar University, Patiala is an authentic record of my own work carried out under the guidance of Mr. PARAG NIJHAWAN, Assistant Professor EIED, Thapar University.

The matter presented in this thesis has not been submitted for the award of any other degree of this or any other university.

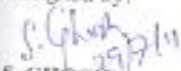

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This is to certify that the above statement made by the candidate is correct and true to the best of my knowledge & belief.


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ABSTRACT

A Power quality problem is an occurrence manifested as a nonstandard voltage, current or frequency that results in a failure or a mis operation of end user equipments. Utility distribution networks, sensitive industrial loads and critical commercial operations suffer from various types of outages and service interruptions which can cost significant financial losses. With the restructuring of power systems and with shifting trend towards distributed and dispersed generation, the issue of power quality is going to take newer dimensions. In developing countries like India, where the variation of power frequency and many such other determinants of power quality are themselves a serious question, it is very vital to take positive steps in this direction. The present work is to identify the prominent concerns in this area and hence the measures that can enhance the quality of the power are recommended. At present, a wide range of flexible ac controllers, which capitalize on newly available power electronics components, are emerging for custom power applications. The device considered in this work is distribution static synchronous compensator (DSTATCOM). The fast response of DSTATCOM makes it the efficient solution for improving power quality in distribution systems.

LIST OF ABBREVIATIONS

PQ	Power Quality
DSTATCOM	Distribution Static Synchronous Compensators
DVR	Dynamic Voltage Restorer
PCC	Point Of Common Coupling
UPQC	Unified Power Quality Compensator
VSI	Voltage Source Inverter
IRPT	Instantaneous Reactive Power Theory
PWM	Pulse Width Modulation
THD	Total Harmonic Distortion
UCES	Ultra Capacitor Energy Storage
ASD	Adjustable Speed Drive
SVPWM	Space Vector Pulse Width Modulation
IGBT	Insulated Gate Bipolar Transistors
VSC	Voltage source Convertor
TCPWM	Triangle Comparison Based PWM
SPWM	Sinusoidal PWM
NPC	Neutral Point Diode Clamped
PI	Proportional Integral
PID	Proportional Integral Derivative
SVC	Static Var Compensator
AC	Alternating Current
APF	Active Power Filters
CSI	Current Source Inverter

FLC	Fuzzy Logic Controller
DISO	Double Input Single Output
NL	Negative Large
NM	Negative Medium
NS	Negative Small
PS	Positive Small
PM	Positive Medium
PL	Positive Large
FLT	Fuzzy Logic Tool
FIS	Fuzzy Inference System
FFT	Fast Fourier Transform

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