A Major-Project report on

"High Reactive Power Compensation Accuracy for cascaded H-Bridge Inverter Based Decoupling"

Submitted to

Jawaharlal Nehru Technological University, Hyderabad

In partial fullfilment of the academic requirements for

the award of Degree of

BACHELOR OF TECHNOLOGY

In

ELECTRICAL &ELECTRONICS ENGINEERING

By

S.HARITHA	**206Y5A0224**
B.KALA RANI	**196Y1A0201**
S.ANVITHA	**196Y1A0214**
G.HARSHINI	**206Y5A0207**

Under the esteemed guidance of

Mr. R.SHASHI KUMAR REDDY M.Tech

Assistant Professor

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

SUMATHI REDDY
INSTITUTE OF TECHNOLOGY FOR WOMEN
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S.R.I.T. FOR WOMEN * WARANGAL *

2022-23

PRINCIPAL
Sumathi Reddy Institute of Technology for Women
Ananthasagar (V), Hasanparthy (M)
WARANGAL - 506 371 (T.S.)

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CERTIFICATE

This is to certify that the major project entitled **"High Reactive Power Compensation Accuracy For Cascaded H-Bridge Inverter Based Decoupling"** submitted to **JNTUH** carried out by the following students of **IV-B.Tech** in the partial fulfillment for the award of the B.Tech Degree in **Electrical&Electronics Engineering** during the academic year 2022-23.

S.HARITHA	**206Y5A0224**
B.KALA RANI	**196Y1A0201**
S.ANVITHA	**196Y1A0214**
G.HARSHINI	**206Y5A0207**

R.S.b.Reddy

Guide

Mr. R.Shashi kumar Reddy

Head of the Dept

Dr. K. Mahender Sharma

S.R.I.T. FOR WOMEN WARANGAL

PRINCIPAL
Sumathi Reddy Institute of Technology for Women
Ananthasagar (V), Hasanparthy (M)
WARANGAL- 506 371 (T.S.)

ABSTRACT

The Static Synchronous Compensator (STATCOM) has gained popularity among many utilities for solving power quality problems in distribution substations. There are many types of topologies for STATCOM found in the literature, of which the Multilevel Cascaded H-bridge Inverter (MCHI) is the most adaptable and energy efficient power inverter topology. The aim of this paper is to define a control scheme and its transfer function in order to achieve low switching frequency and high-bandwidth power control of MCHI. The controller of the proposed STATCOM system is implemented to provide vector control for reactive power or Voltage-Ampere Reactive (VAR) compensation at the Point of Common Coupling (PCC) under balanced loading conditions. To accomplish this, mathematical equations for a STATCOM system is derived in dq-coordinates based on Park's transformation. Then, the designed equations are used to calculate appropriate values of the controller's gain parameters for realizing the cascade Pulse Width Modulation (PWM) STATCOM with various voltage and current ratings. Lastly, the performance of the proposed control scheme is verified through simulation and numerical analysis using MATLAB-Simulation link.

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Principal
Sumathi Reddy Institute of Technology for Women
Ananthasagar (V), Hasanparthy (M)
WARANGAL - 506 371 (TS)