VOLTAGE CONTROLLER FOR THREE PHASE D-STATCOM TO COMPENSATE NON LINEAR LOADS

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Abstract—*In a distributed system D-STATCOM is used to compensate nonlinear loads. The proper operation of D-STATCOM will maintain system voltages unchanged. A fast acting voltage controller for D-STATCOM is presented in this paper. The detailed simulation and experimental studies are carried out to validate proposed model.*

Key Words:*D-STATCOM,H-type inverter model,Simulation.*

1. INTRODUCTION

The Transients will effect voltage of the distribution network. Power Quality has become an important, many loads at various distribution ends like adjustable speed drives, process Industries, Printers, domestic Utilities, computers, microprocessor based equipment etc. power quality mainly deals with issues like maintaining a fixed voltage at the Point of Common Coupling for many distribution voltage levels .

2.DSTATCOM CONNECTED TO DISRIBUTION SYSTEM

The three phase D-STATCOM is connected to the distribution network at the point of common coupling to compensate nonlinear loads as shown in figure 1.d-statcom is controlled by H-type inverter model to make the operation of the D-STATCOM faster.
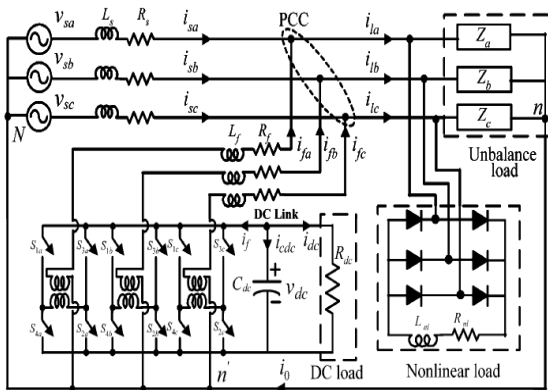

Figure 1 DSTATCOM connected to distribution network

3. FAST ACTING VOLTAGE CONTROLLER FOR D-STATCOM

A   Fast acting H-type inverter is used for voltage controlling of D-STATCOM In this inverter model for three phases (a,b,c) and neutral wires are present .In this inverter model four legs are present.each leg contains two switches during its operation only one switch in each leg is ON and the other switches are OFF as shown in figure 2.
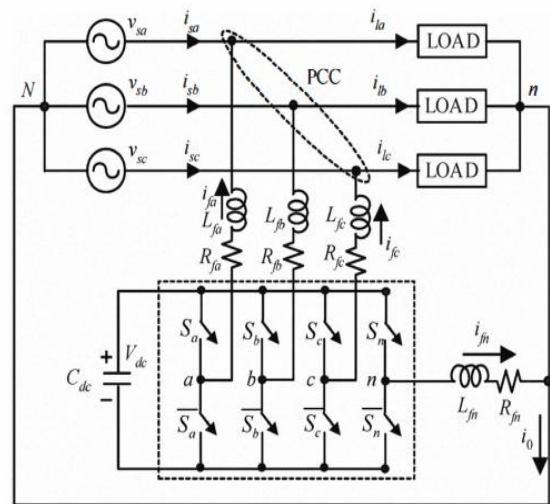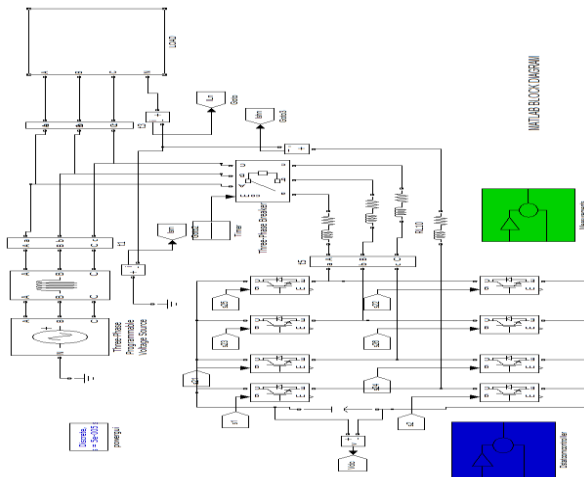

Figure 2 H-bridge inverter model

4. MATHEMATICAL MODELLING

The proposed simulation model is shown in figure3.This model is used to eliminate harmonics and compensate nonlinear loads in the system. The state-space equations are solved to compute the actual compensator currents and dc-link voltage. These actual currents are compared with the reference currents   using hysteresis current control.

5. SIMULATION RESULTS

The simulation results of the proposed model is showm in figure 4 in which the harmonics are eliminated and power quality is acheived by the system using D-statcom controlled by H-bridge inventer model for fast operation of the device.
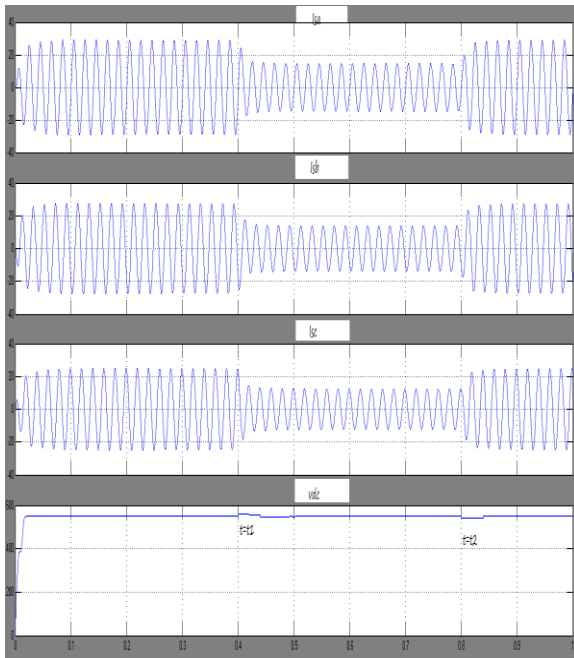

Figure 4 Simulation results of source voltages, source currents and load currents after compensation.

6. CONCLUSION

The voltage controller for D-STATCOM is used to compensate nonlinear loads and also to make D-STASTCOM act fast during transients. By using this model a better power quality is achieved by eliminating harmonics and distortions. The H-bridge controller gives fast transient response under load transients.

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