

# Utilization Of Dstatcom In Matlab To Improvement Of Power Quality By Voltage Control

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**Abstract** :This paper proposes another topology by Distribution Static Compensator utilizing Mat lab. This proposed strategy for control quality change accomplishes UPF which isn't conceivable in past strategies. Most extreme UPF is kept up, while managing voltage at the heap terminal, amid variance of load. Dstatcom illuminates Power quality issues by accomplishing PF rectification, consonant end, stack adjusting, and voltage control in light of the heap prerequisite.

**Index Terms**— power quality, DSTATCOM, PF correction, harmonic elimination, load balancing, voltage control, mat lab.

## I. INTRODUCTION

As of late, Electrical Power Quality had gotten more consideration in control designing. In exhibit day's energy dispersion framework is experiencing extreme control quality issues. These power quality issues incorporate high responsive power trouble, sounds currents, load unbalance, unnecessary impartial current and so on. The measure of energy quality relies on the requirements of the gear that is being provided [1]. What is great power quality for an electric engine may not be sufficient for a personal computer.

Normally the term control quality alludes to keeping up a sinusoidal waveform of transport voltages at evaluated voltage and recurrence. The waveform of electric power at age organize is absolutely sinusoidal and free from any twisting.

A significant number of the power change and utilization hardware are additionally intended to work under unadulterated sinusoidal voltage waveforms. In any case, there are numerous gadgets that mutilate the waveform. These twists may spread everywhere throughout the electrical system. In late years, there has been an expanded utilization of non-direct loads which has brought about an expanded part of non-sinusoidal streams and voltages in Electric Network.

A Distribution System Suffers from Current and also voltage related Power Quality Problems, which incorporate poor power factor, mutilated source current and voltage aggravations [2]. DSTATCOM are utilized

asa part of the circulation framework for development of energy quality issues. The voltage lists/swells have turned into the fundamental driver of hardware breaking down, stumbling in the ventures due unbalance between the power free market activity. From the most recent decade, there have been impressive advancements and changes in vitality stockpiling innovations [12].

This paper considers the activity of DSTATCOM in VCM and proposes a control calculation to acquire reference stack terminal voltage. This calculation gives the two favorable circumstances of VCM and CCM. UPF task is accomplished at ostensible load, though quick voltage control is given amid voltage vacillations. In the meantime receptive and symphonious part of load current is provided by the compensator whenever of Operation. The whole control is tried with three stage four wire dissemination framework. This proposed calculation is approved through reenactment and test comes about.

## A. POWER INJECTION PRINCIPLE

The aggregate evident (complex) control that is infused into a transmission line is comprised of two parts, to be specific dynamic and receptive. The dynamic power P segment is the piece of vitality that is changed over into physical vitality shape. The receptive power Q part makes the crucial attractive medium required for the greater part of the present electromagnetic vitality transformation gadgets and frameworks.

The larger part of mechanical and business machines require both dynamic and responsive power parts for activity. Both P and Q are required in a split second and in various amounts to meet the necessity of the electrical vitality changing over gadget associated with the AC source [3]. Receptive power can be ingested or provided relying upon the vitality medium related with the electric gadget. Vitality retaining or providing parts are reactors and capacitors individually. Reactors assimilate receptive power +Q and draw slacking current [15].

The expended vitality is put away as an attractive vitality in the reactor turns. Then, capacitors supply responsive power - Q and draw driving current, putting away it as electric charge inside its dielectric medium and related charge plates. To comprehend P and Q stream in a

transmission framework, consider a basic framework that is comprised of sending and getting transports with a transmission link in the middle of as appeared in Figure 1 [13, 14].

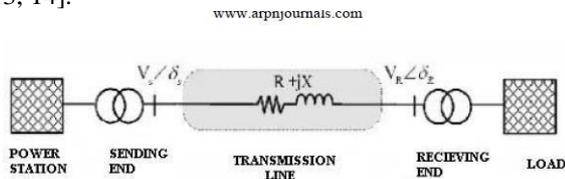


Figure-1. Transmission system.

**BLOCK DIAGRAM OF PROPOSED SYSTEM**

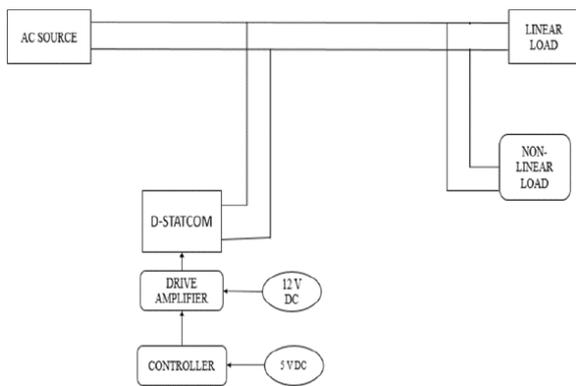


Figure-2. Block diagram.

Figure-2 speaks to the piece outline of the proposed framework. DSTATCOM directs terminal voltage attractively; contingent on the appropriately picked VSI parameters. Air conditioning source is energized with three stage voltage. Controller is enacted with 5V and the drive speaker is actuated with 12V DC supply. This enhancer improves the information esteems to the DSTATCOM.

**VSI PARAMETERS DESIGN**

The Dc transport voltage is taken double the pinnacle of stage voltage of source esteem. Estimation of DC capacitors are picked in view of a time of Sag/Swell and change in DC transport voltage amid homeless people [4]. This voltage esteem keeps on diminishing until the capacitor voltage controller comes energetically. Inductance Filter gives sensibly high exchanging recurrence and adequate rate of progress of current with the goal that VSI streams take after wanted ebbs and flows.

**PROPOSED METHOD USING LINEAR LOAD**

This control conspire is actualized utilizing Matlab 2014 programming. Mutilated and unequal source streams moving through the feeder make terminal voltages uneven and contorted.

Recreation parameters are said beneath as,

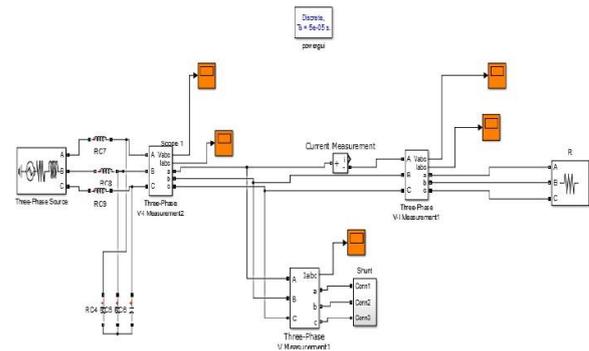


Figure-3. Simulation diagram for linear load with DSTATCOM.

Source voltage: 400V, 50 HZ,  
 Feeder impedance:  $Z = 1 + j 3.14 \Omega$   
 Linear load:  $Z_a = 20 + j73.8 \Omega$   
 $Z_b = 30 + j67.5 \Omega$   
 $Z_c = 40 + j53.4 \Omega$   
 Nonlinear load: RL Load of  $50 + j73.4 \Omega$   
 VSI parameters:  $V_{dc} = 600V$ ,  $C_{dc} = 2000\mu F$ ,  $R_f = 1 \Omega$ ,  $L_f = 20mH$ ,  $C_{fc} = 4\mu F$ ,  $I_{rated} = 30A$

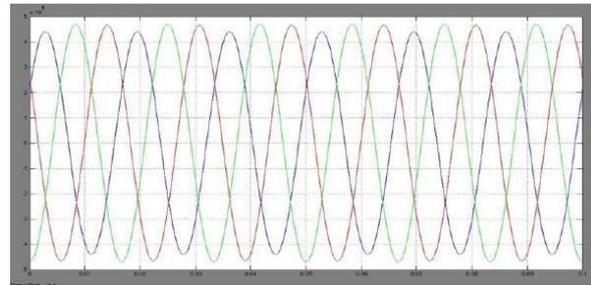


Figure-4. Output voltage of linear load without DSTATCOM.

By Applying customary strategy for a similar circuit, source streams lead terminal voltages which demonstrate that the compensator supplies responsive current to the source to conquer feeder drop, notwithstanding supply fellow responsive and symphonious streams.

Utilizing this proposed strategy, terminal voltages and source streams are in stage with each other along adjusted and sinusoidal. Additionally UPF is accomplished at the heap terminal by keeping up appropriate greatness of voltage [5]. Sag is made by decreasing source voltage by 25% from its characterized an incentive at  $t = 0.5$  secs and list is expelled at  $t = 1.1$  secs as appeared in figure 4. This controller gives quick voltage direction at the heap terminal [10]. On the off chance that the VSI is constrained to alleviate 25% hang then the sparing in rating can be utilized to moderate extra sag. During homeless people this voltage goes amiss from its reference voltage, however returned back to its reference esteem once consistent state is come to. Source voltage is decreased to half of the characterized esteem which has the ability to moderate profound droop by applying DSTATCOM.

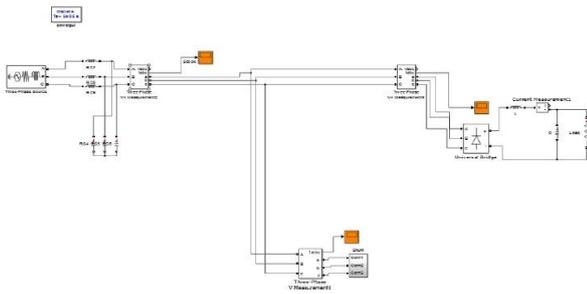


Figure-5. Simulation diagram for nonlinear load with DSTATCOM.

Load is expanded to 120% of characterized esteem to such an extent that the conventional strategy gives less power factor without DSTATCOM and can be enhanced by applying this DSTATCOM [6]. The voltage yield waveforms are as appeared in Figure 4 and 6.

The proposed strategy is tentatively checked on a diminished scale set up. In this technique the rms estimation of source current is lessened from 0.61 to 0.73 An and source current is additionally diminished to 1.75 A from 1.84 An in this proposed strategy [7, 8]. Along these lines misfortunes in VSI are lessened and furthermore ability of DSTATCOM to moderate profound list is expanded.

Thus the proposed plot can give quick voltage control. The exploratory outcomes are very predictable with the reenactment comes about. They demonstrate the adequacy of the proposed control framework.

## CONCLUSIONS

In this paper, a technique has been proposed for the age of reference stack voltage for a voltage controlled DSTATCOM[9]. The execution of the proposed plot is contrasted and the customary voltage controlled DSTATCOM utilizing direct and nonlinear load[11]. The proposed strategy fulfills the accompanying conditions with the end goal that upkeep of UPF even at stack changes, better voltage control, misfortunes are diminished in VSI. The reproduction and trial comes about how that the proposed conspire gives DSTATCOM, a capacity to enhance a few PQ issues.

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