

VOLTAGE DIP MITIGATION USING STATIC VAR COMPENSATOR

BRIJESH TRIVEDI

MGITER – NAVSARI(GUJARAT)

M.E.2ND YEAR 4TH SEMESTER ELECTRICAL ENGINEERING DEPARTMENT

Abstract - Now a day power quality problem has become a major issue to deal with, in order to maintain quality supply. Modern generation greatly depends on electrical energy for improving their life style. Modern equipment like computers, electric motors etc. cannot run without electricity. In order to improve the performance, the equipment demands quality supply. The power quality is affected by various factors of the electrical network. Power quality problems such as voltage and frequency variation, harmonic contents affect the performance of electrical utility and shorten its life time. Such problem has to be compensated to ensure the quality supply. One of the most frequently occurring power quality problems in transmission network is voltage sag/swell. Such problems can cause heavy flow of current reduces the life time of the equipment or can cause over voltage affecting the insulation level of the equipment. Many modern custom devices are present in order to mitigate such problems. Among them, Dynamic Voltage Restorer (DVR) is efficient and cost effective. In this paper, an overview of DVR and control scheme used to control the DVR is present.

Key Words: D.V.R., VOLTAGE SAG & SWELL.

1. INTRODUCTION

With the increasing use of non-linear loads and complexity of the network, the power system network faces challenges to deliver quality power to the consumers. Electric power been delivered is affected by many factors at the distribution network which has to be compensated to improve the quality and quantity of power been delivered. This chapter discuss about the power quality, its necessity, power quality issues and consequences. Power Quality concerns about the utility ability to provide uninterrupted power supply. The quality of electric power is characterized by parameters such as “continuity of supply, voltage magnitude variation, transients and harmonic contents in electrical signals”. Synchronization of electrical quantities allows electrical systems to function properly and without failure or malfunction of an electric device.

1.1 BASIC STRUCTURE AND PRINCIPLE

DVR is series connected compensating devices that restore/maintain the voltage profile at the sensitive loads under voltage unbalance. It is usually connected in the distribution network between Common Point of Coupling (PCC) and load. Fig.1 shows the location of DVR in power system network. The disturbance in the system is detected by control scheme used which generates the triggering pulses for VSI. Passive filters are used to filter out the harmonic content of injected voltage. DVR injects the filtered output voltage through injection transformer.

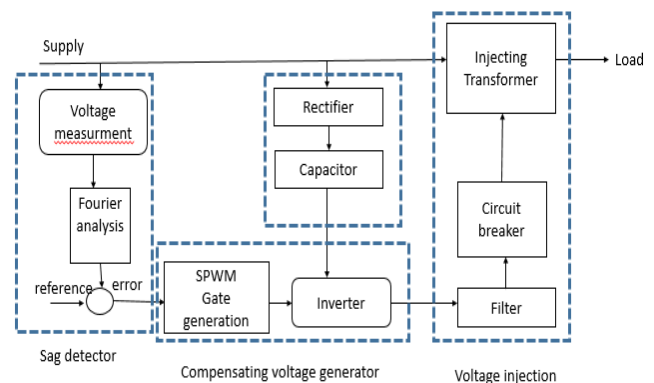


Fig.1 Block Diagram of Dynamic Voltage Restorer

1.2 OPEN LOOP SIMULATION AT DIFFERENT LOAD CONDITION

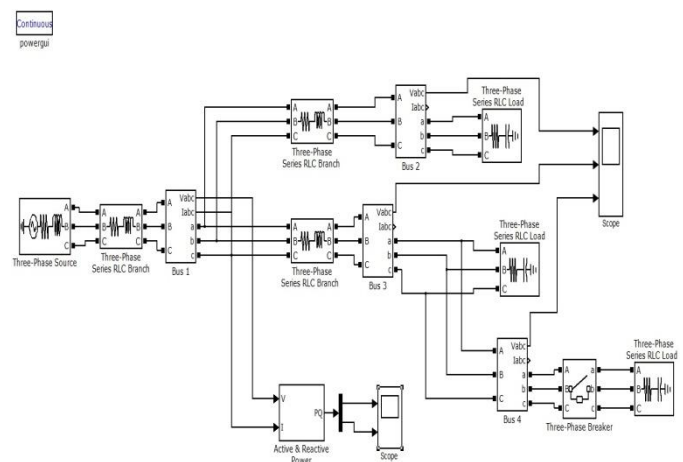


Fig.2 Simulation of Distribution system generate sag from load side

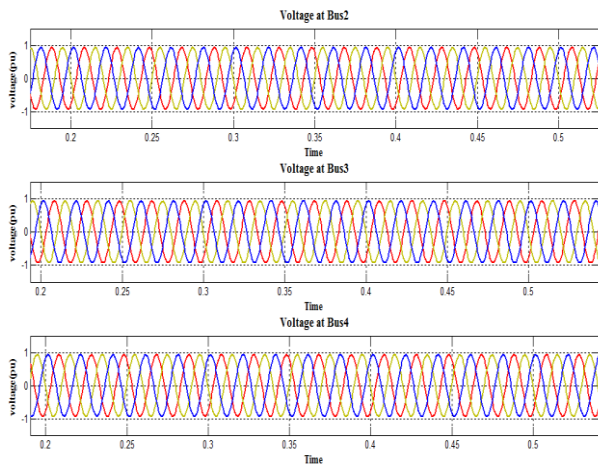


Fig.3 output all buses at healthy load condition

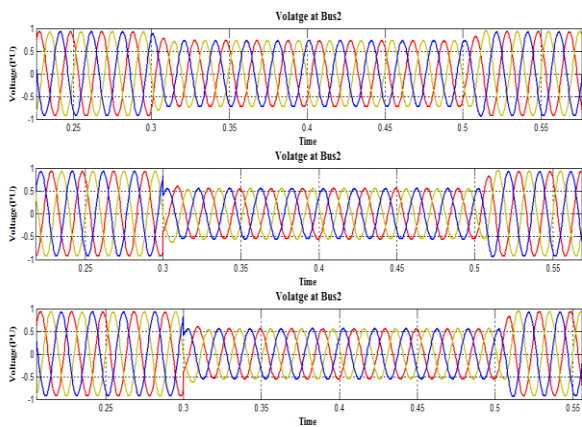


Fig. 4 output at time of sudden load increase on bus4

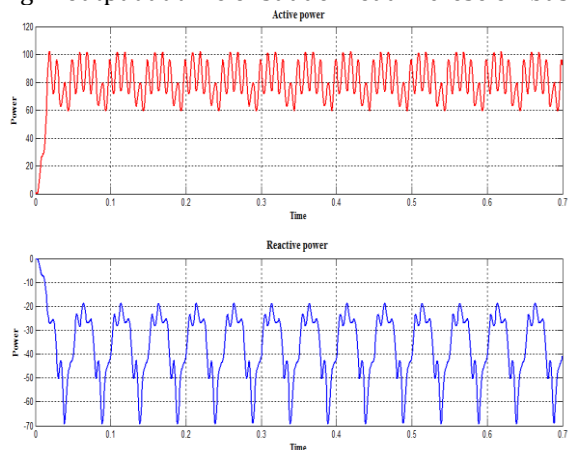


Fig. 5 Active and Reactive power at normal condition

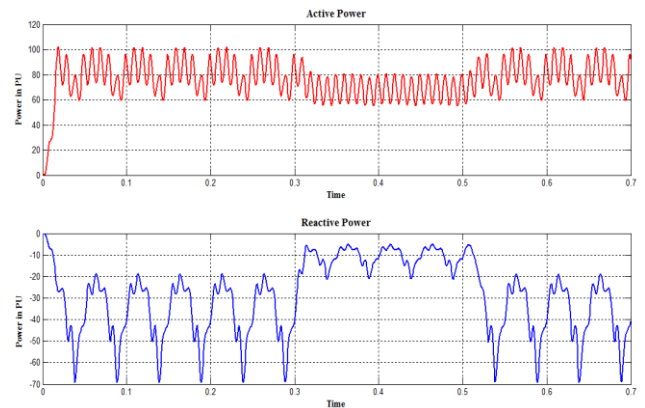


Fig. 6 Active and Reactive power at time of load increase on bus

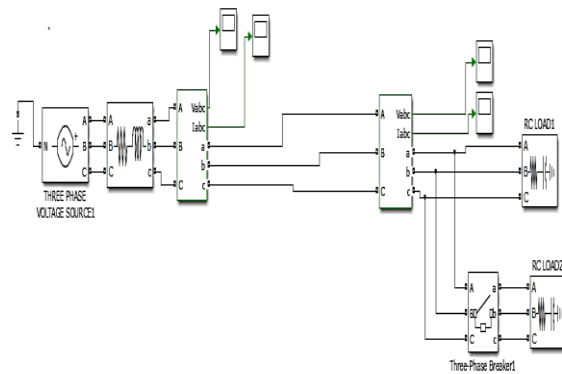


Fig.7 Simulation of Distribution system generate swell from load side

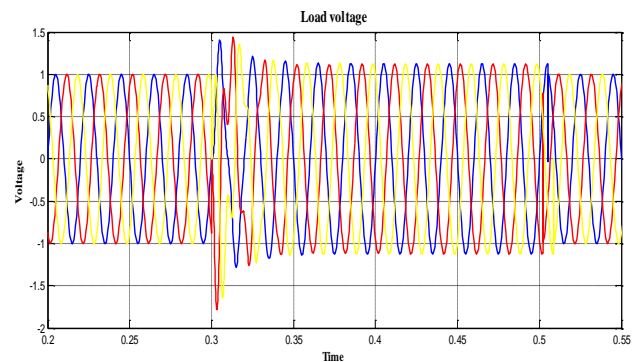


Fig.8 Output at time of sudden load increase

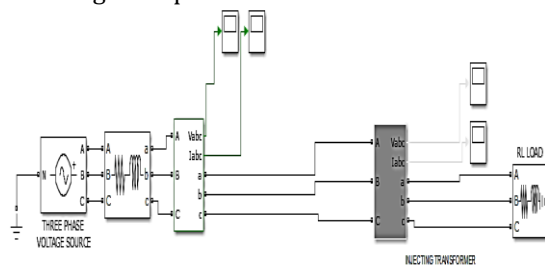


Fig. 9 Simulation of distribution system generate sag and swell from source side

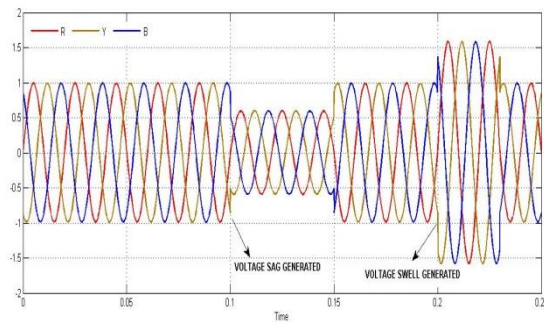


Fig. 10 Simulation Result of Sag and Swell voltage

Table -1: Parameter and Rating

SR.NO	Name Of Parameter	Vaule of Parameter
01	Supply Voltage	415V
02	Frequence	50Hz
03	Line resistance	R=0.010hms
	inductance	L=1e-3H
04	Load	P=1000W

3. CONCLUSIONS

Voltage sag of three phase distribution system in open loop with help of matlab simulation we conclude that open loop simulation voltage must be deep at time of load sudden increase at any bus of system that means sag to be generated and also same phenomena in sudden load disconnect from the system that means swell to be generated.

4. FUTURE WORK

Choosing appropriate control strategy (Synchronous reference frame theory) which has accurate performance and fast acting response against mitigate voltage sag and swell.

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