

Dynamic Voltage Restorer

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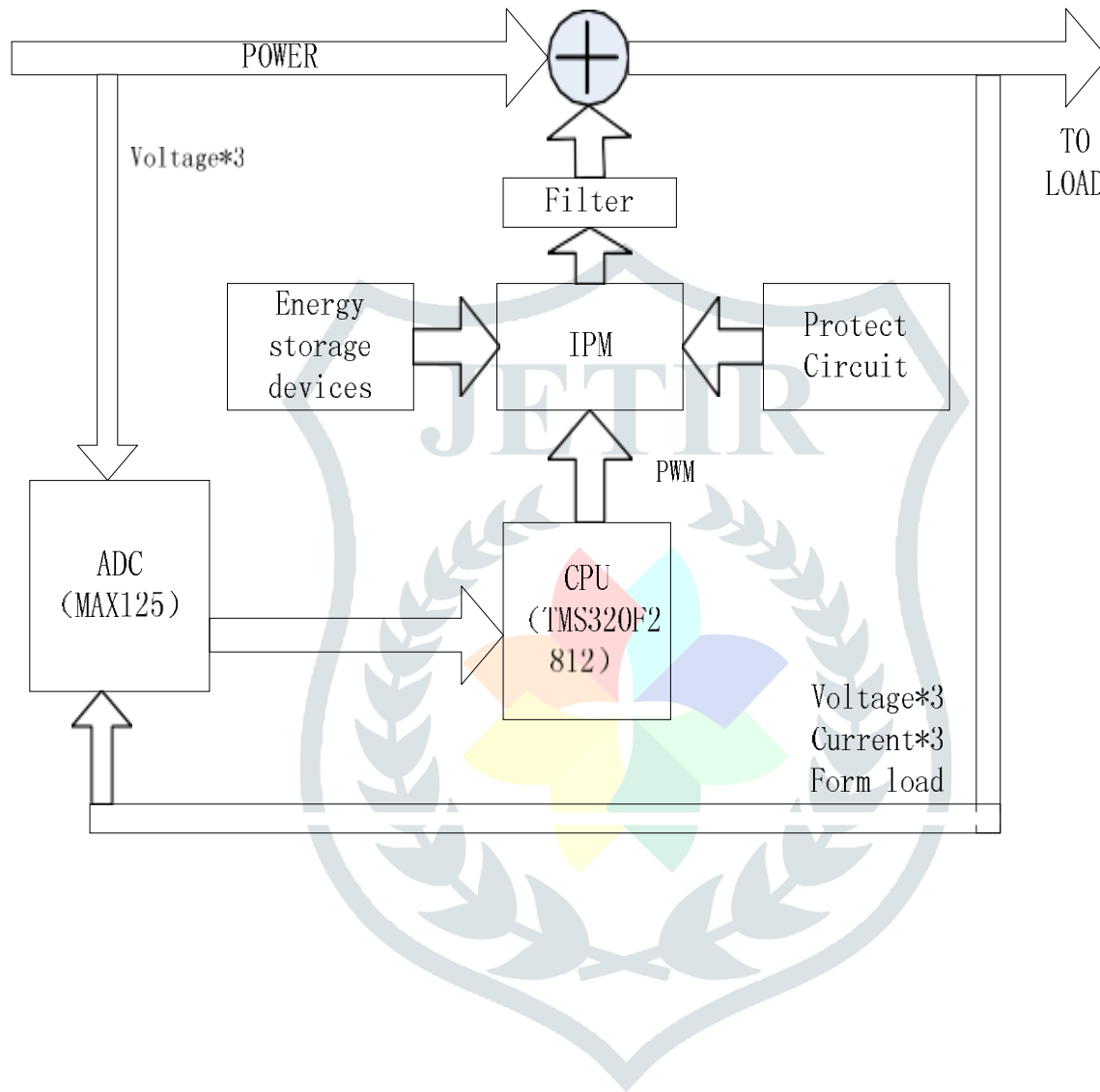
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Abstract - First of all we need to know what is power quality. Power quality is one of the major issue during these days. Power quality (good) can be defined as stable supply voltage that remains within the specify range. Improper supply can lead to damage the equipment or may not give expected output. Power quality problems is an incidents seem as a abnormal current, voltage or repeat that outputs in error of close operate equipment's. Conscious mechanical weights and adequacy flow frameworks experience the evil encounter of various sorts of power outages and organization impedance which can lead to an important fiscal failure. For improvement of power quality special type of power devices are used. One of them is known as (DVR) dynamic voltage restorer. Working of dynamic voltage restorer is shown in simulation below. In this project, PWM generator and DQ controller (PLL based) are used for control logic. For different load ,different supply voltage is given. The major issues oversaw here are voltage swell, voltage swag, and voltages unbalances. The operating standard of DVR is delineated as underneath: Exposure circuit is used in first to distinguish the current and voltage of the network. we can develop the needed redress voltage abundancy . Inverter is use to convert dc to ac, and a channel circuit is used to penetrate through demand for symphonious of output wave. So that voltage is taken and it is enclose on voltage of structure with help of transformer.

INTRODUCION -

Deviation of current and voltage from its optimal current waveform and optimal voltage waveform is known as power quality. Voltage sags remains until all errors or fault are cleared . Voltage swell can also be defined as increase in root mean square (RMS) voltage or current during the period of 0.5 cycle to 1 min. normal sizes (magnitude) are between 1.1 and 1.8 . Voltage swell are less important than voltage sag because most of the fault occurs in system are of voltage sag and not of voltage swell. Voltage swell and sag may lead to sensitive rigging, to shutdown or fail, or can lead to large current unbalance which can lead to damage the wire or outing breakers . These types of damages or errors can lead to increase the repairing cost . So DVR is used in this project to overcome these problem by help of injecting voltage through transformers. simulation is done to see the circuit of DVR and how it change the output of system .

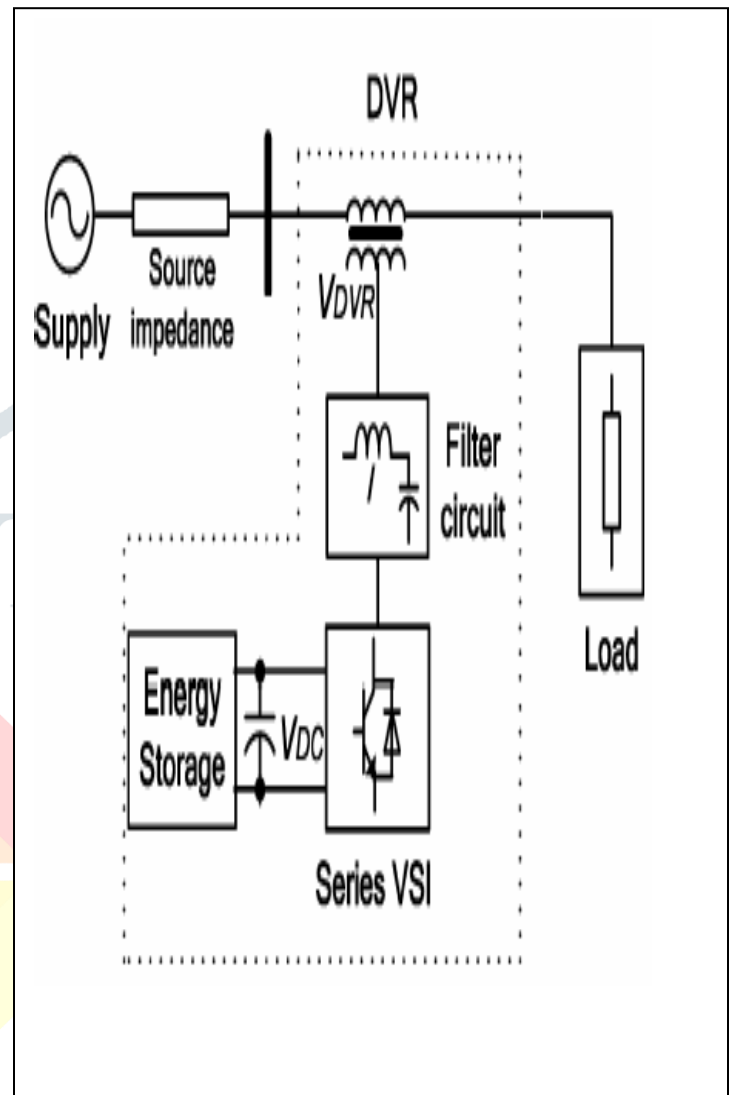
Block diagram of DVR



Rule of DVR Task-

A (DVR) is voltage enhancing device which is connected to a system in series. The main component of (DVR) are harmonic filter, injecting transformer, capacitor, control system and VSI(voltage source inverter). A (DVR) is strong state control contraptions trading device involving either igtb or gto, a storage(capacitor) as an and a transformers. The main role of (DVR) is to inject a voltage with help of the transformer. A DC - AC inverter controls the voltage by help of sinusoidal (PWM)pulse width modulation procedure. During normal condition, the (DVR) gives only a little voltage to system through transformer. when voltage sag occurs in system, the(DVR) device determine the amount of voltage required for recovery and then that voltage is transmit through transformer.

The (DVR) fit for making or immersing responsive potential yet dynamic potential imbuelement of the equipment must be given by outside source or imperativeness accumulating system. Response time of (DVR)dynamic voltage restorer is extraordinarily small and that is enforced by power equipment and voltage list response time. The expected response time of system is near 25 milliseconds and which is significantly not exactly a segment of the standard methodologies for voltage cure, for instance, tap-advancing transformers.



Power circuit of DVR

The DVR is a custom power contraption that is related in course of action with the spread system as showed up in figure. The essential portions of the (DVR) contains an imbuelement transformer, consonant channel, course of action VSI (VSC) an energy storage and control structure. Normal limit of the DVR is to diffuse an heavily controlled voltage generated by system converter in course of action to vehicle voltage through skills for a support transformer. Transient amplitudes of three varied stage voltages are manipulated. This suggests any varied voltages achieved through ephemeral agitating impacts noticeable all around conditioner provider will be compensated through a uniform voltage made by converter and that is injected on the system voltage level with the help of support transformer. (DVR) operates self-sufficiently of the kind of fault or program that happens in structure, gave that the full system stays connected with the supply cross section, for instance the line breaker does not trip. For most rational cases, an undeniably productive structure can be practiced by simply reimbursing the negative and positive progression portions of voltage disrupting impact visible at commitment of (DVR). This decision is justifiable in light of the way that for an ordinary dissemination transport structure, the zero progression part of an agitating impact won't experience the movement cascading transformer because of the unlimited impedance for this part of system. (DVR) has two methods for process which are: lift mode and other one is reinforcement mode. The transformer's voltage winding(low) is shorted by converter. No exchange of semiconductors happens in this method for movement, in light of the way that the base of individual converter

are started, for instance, to develop short out path for transformer affiliation..

Voltage sag

The primary reproduction of three stage voltage list is mimicked also, a half three-stage voltage list happening at the utility matrix . additionally demonstrates a half of the voltage sag initiate at 0.1s till 0.3s, with overall voltage list span of around 0.2 sec . Due to DVR, the mass voltage is stored at 1 Pu .Through recreation , supply voltage with first` stage voltage potential decreases .A voltage sag is a brief term decrease in rms voltage due to fault can be treated by applying (DVR) to system which can help to overcome these problem . Voltage sag generate when the rms voltage reduces to range between 10% to 90% one particular time period. A few references characterizes the span of a hang for a time of 0.5 cycle to a couple of moments, and longer term of low voltage would be known as a sustained sag.

Voltage Swells

Voltage swell is the inverse of voltage sag. Voltage swell, which is a passing increment in voltage, happens when a substantial burden kills in a power framework.The excess of main voltage is increased about 25% from its original voltage. From the output, the haul voltage is remain kept at the avowed impetus with assistance of DVR. Like instance of voltage sag, DVR responds rapidly to infuse proper voltage segment to address the main voltage.

Simulation result and review

A basic reproduction of the DVR control framework was performing utilizing MATLAB/SIMULINK program in Request to check the activity. The parameters of the DVR system are as follows. In request to comprehend the execution of the DVR alongside control in voltage lists and swells mitigation, a straightforward dissemination arrange is mimicked utilizing MATLAB (Figure-3). Voltage lists and swells are mimicked by impermanent association of various impedances at the supply side transport. A DVR is associated with the framework Through an arrangement transformer with a capacity to Supplement a most extreme voltage of half of the stage to ground framework voltage. Aside from this, an arrangement Channel is likewise used to expel any high recurrence segments of intensity . The heap considered in the ponder is a 5 KVA limit with slacking power factor

Table-1. System data.

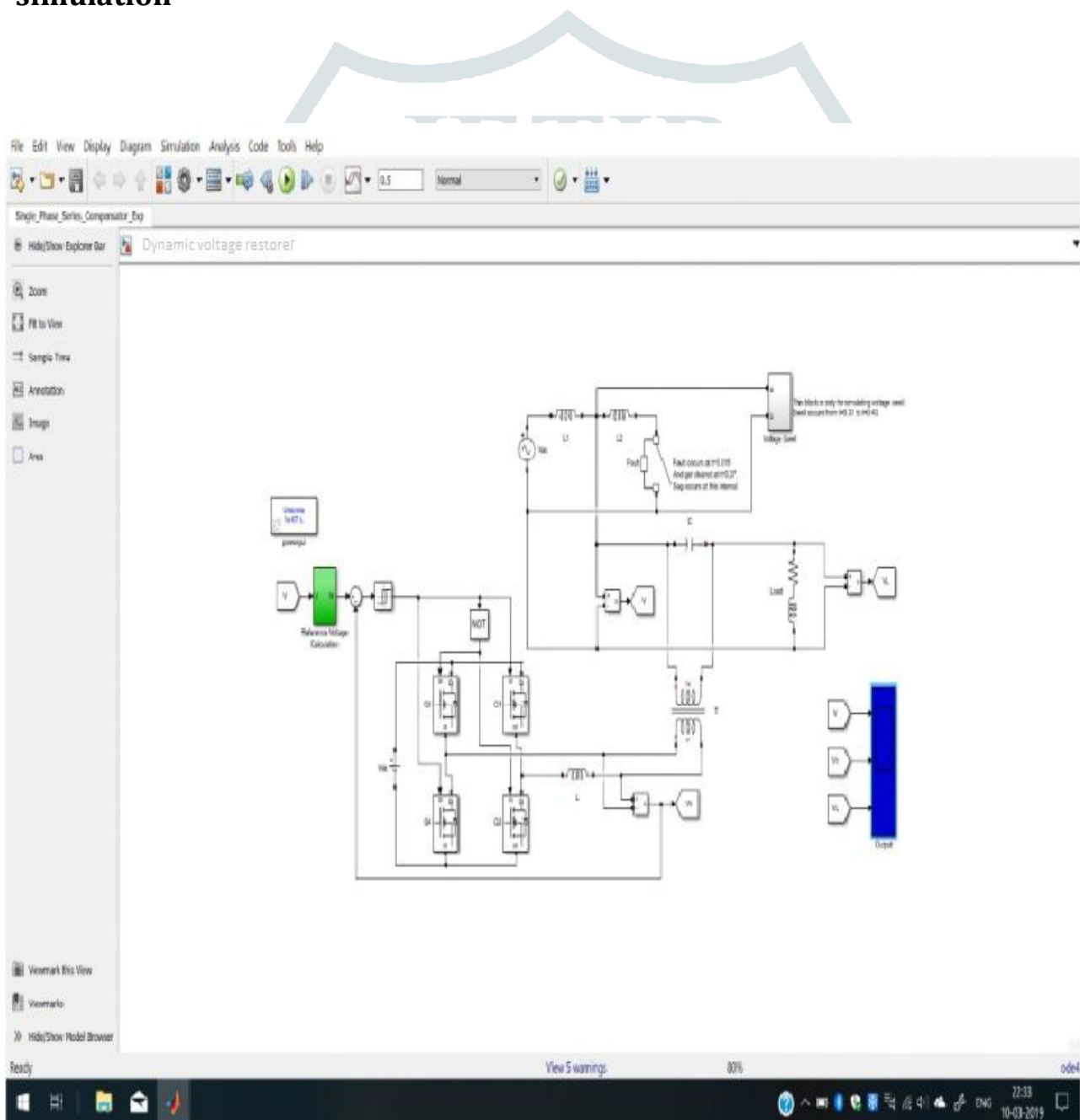
Supply Voltage	240V
Series transformer turns ratio	1:2
DC link Voltage	120V
Filter Inductance	0.5mH
Filter capacitance	1uF
Load resistance	200 Ω
Load inductance	200mH

Conclusions-

The modeling and simulation of a DVR using MATLAB/SIMULINK has been presented. A control system based on dqo technique which is a scaled error of the between source side of the DVR and its reference for sags/swell correction has been presented. The simulation shows that the DVR performance is satisfactory in mitigating voltage sags/swells.

The main advantage of this DVR is low cost and its control is simple. It can mitigate long duration voltage sags/swell efficiently. Future work will include a comparison with a laboratory experiments in order to compare simulation and experimental results.

simulation



Output



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