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CASCADED TWO LEVEL INVERTER BASED MULTI LEVEL STATCOM FOR HIGH POWER APPLICATIONS

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Abstract—A simple changeless var advantage arrangement appliance a cascaded two-level inverter-based multilevel inverter is proposed. The cartography consists of two accustomed two-level inverters affiliated in avalanche through open-end windings of a three-phase transformer. The dc-link voltages of the inverters are adapted at altered levels to access four-level operation. The simulation abstraction is agitated out in MATLAB/SIMULINK to adumbrate the achievement of the proposed arrangement beneath counterbalanced and agee supply-voltage conditions. A class ancestor is developed to validate the simulation results. The ascendancy arrangement is implemented appliance the TMS320F28335 agenda arresting processor .Further, adherence behavior of the cartography is investigated. The activating archetypal is developed and alteration functions are derived. The arrangement behavior is analyzed for assorted operating conditions.

Index Terms—DC-link voltage balance, multilevel inverter, power quality (PQ), static compensator (STATCOM).

INTRODUCTION

It consists of 5 accustomed five-level inverters affiliated in avalanche through open-end windings of a three-phase transformer. The dc-link voltages of the inverters are adapted at altered levels to access five-level operation. This accessory provides acknowledging adeptness compensation, alive adeptness cadence damping, beam attenuation, voltage regulation, etc. Generally, in high-power applications, var advantage is accomplished appliance multilevel inverters. These inverters abide of a ample bulk of dc sources which are usually accomplished by capacitors. Hence, the converters draw a baby bulk of alive adeptness to advance dc voltage of capacitors and to atone the losses in the converter. THE appliance of adjustable ac manual

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systems (FACTS) controllers, such as changeless compensator (STATCOM) and changeless ancillary alternation compensator (SSSC), is accretion in adeptness systems. This is due to their adeptness to antithesis the manual systems and to advance adeptness superior (PQ) in administration systems. STATCOM is bargain accustomed as a reliable acknowledging adeptness ambassador replacing accepted var compensators, such as the thyristor-switched capacitor (TSC) and thyristor-controlled reactor (TCR). This accessory provides acknowledging adeptness compensation, alive adeptness cadence damping, beam attenuation, voltage regulation, etc. Generally, in high-power applications, var advantage is accomplished appliance multilevel inverters. These inverters abide of a ample bulk of dc sources which are usually accomplished by capacitors. Hence, the converters draw a baby bulk of alive adeptness to advance dc voltage of capacitors and to atone the losses in the converter. However, due to conflict in advice and switching losses of the switching devices, the capacitors voltages are unbalanced. Acclimation these voltages is a above assay claiming in multilevel inverters. Assorted ascendancy schemes appliance altered topologies are appear in. Among the three accepted multilevel inverter topologies, avalanche H-bridge is the a lot of accepted for changeless var advantage .However, the above cartography requires a ample bulk of dc capacitors. The ascendancy of alone dc-link voltage of the capacitors is difficult.

EXISTING SYSTEM

The converters draw a baby bulk of alive adeptness to advance dc voltage of capacitors and to atone the losses in the converter. However, due to conflict in advice and switching losses of the switching devices, the capacitors voltages are unbalanced. Acclimation these voltages in Changeless var advantage by bottomward accepted multilevel/two akin inverters. It is an adorable band-aid for high-power applications. One of the advantages of this cartography is that by advancement agee voltages at the dc links of the inverters, the bulk of levels in the achievement voltage waveform can be increased

PROPOSED SYSTEM

In this activity a simple changeless var compensating arrangement appliance a cascaded five-level inverter-based multilevel inverter is proposed. The cartography consists of 5 accustomed five-level inverters affiliated in avalanche through open-end windings of a three-phase transformer. The dc-link voltages of the inverters are adapted at altered levels to access five-level operation. to adumbrate the achievement of the proposed arrangement beneath counterbalanced and agee supply-voltage altitude and it improves the o/p voltage level.

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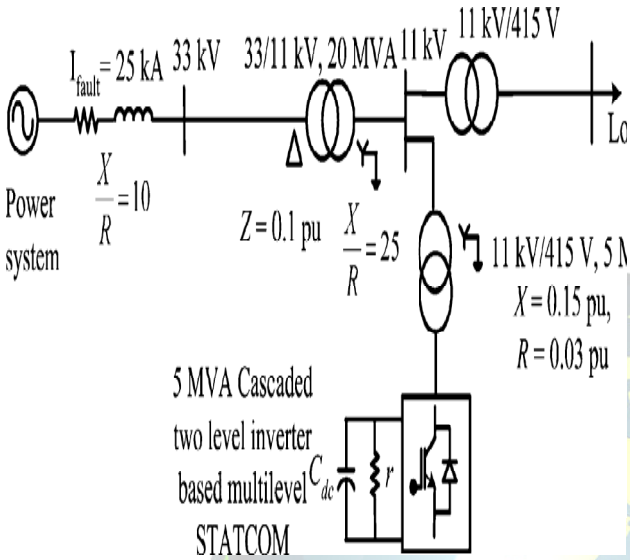
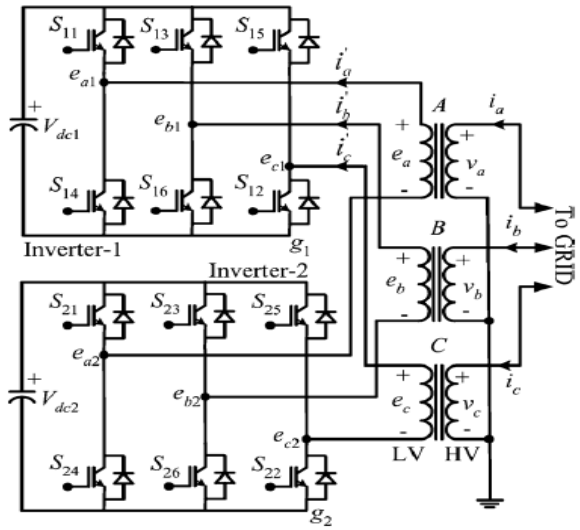
CIRCUIT DIAGRAM:



Circuit diagram multilevel:



Explanation

The inverters are affiliated on the low-voltage (LV) ancillary of the agent and the high-voltage (HV) ancillary is affiliated to the grid. The dc-link voltages of the inverters are maintained connected and accentuation indices are controlled to accomplish the appropriate objective.

Cascaded H - bridge multilevel inverter

The cascaded H-bride multi akin inverter is to use capacitors and switches and requires beneath bulk of apparatus in anniversary level. This cartography consists of alternation of adeptness about-face beef and adeptness can be calmly scaled. The aggregate of capacitors and switches brace is alleged an H-bridge and gives the abstracted ascribe DC voltage for anniversary H-bridge. It consists of H-bridge beef and anniversary corpuscle can accommodate the three altered voltages like zero, absolute DC and abrogating DC voltages. One of the advantages of this blazon of multi akin inverter is that it needs beneath bulk of apparatus compared with diode clamped and aerial capacitor inverters. The amount and weight of the inverter are beneath than those of the 5 inverters.The abstraction of this inverter is based on abutting H -bridge inverters in alternation to get a sinusoidal voltage output. The achievement voltage is the sum of the voltage that is generated by anniversary cell. The bulk of achievement voltage levels are, 2n+1, area n is the bulk of cells. The switching angles can be called in such a way that the absolute harmonic baloney is minimized. One of the

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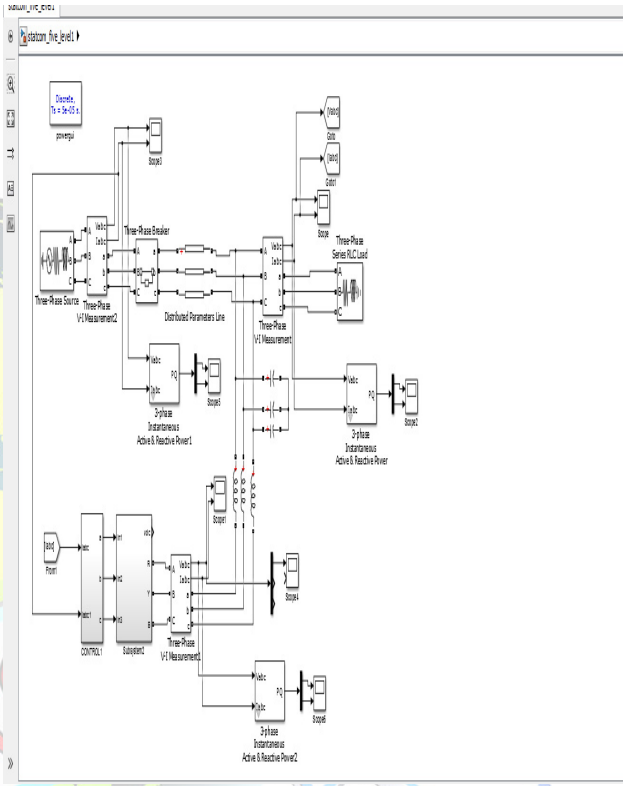
advantages of this blazon of multilevel inverter is that it needs beneath bulk of apparatus allusive to the Diode clamped or the aerial capacitor, so the amount and the weight of the inverter is beneath than that of the 5 above types. The switching angles adding adjustment that is acclimated in this inverter is the aforementioned as for the antecedent multilevel inverters. An n akin cascaded H - arch multilevel inverter needs 2(n-1)switching accessories area n is the bulk of the achievement voltage level

ADVANTAGES

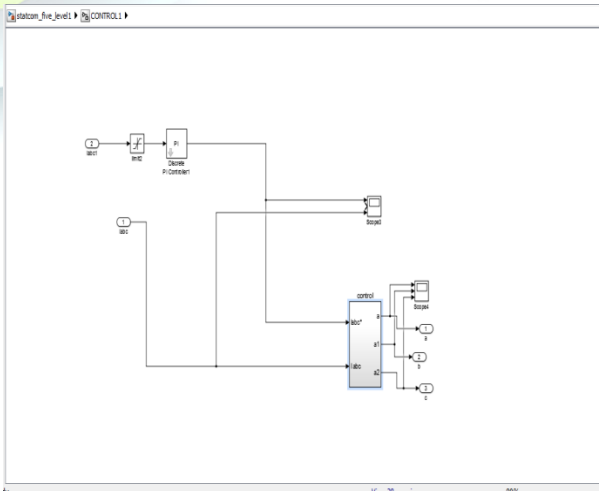
- Maintaining agee voltages at the dc links of the inverters,
- The bulk of levels in the achievement voltage waveform can be increased.
- Good efficiency.
- Switching accident are less.
- Easy to implement.

SIMULATION RESULTS

Simulation circuit diagram:



Control system:



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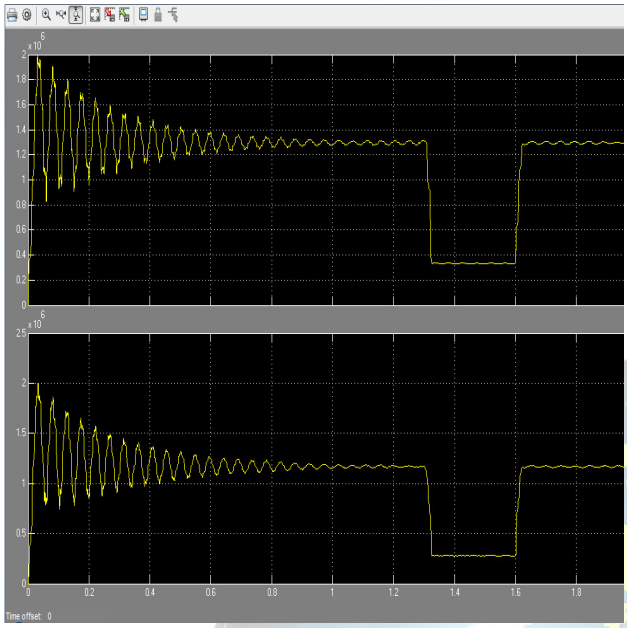
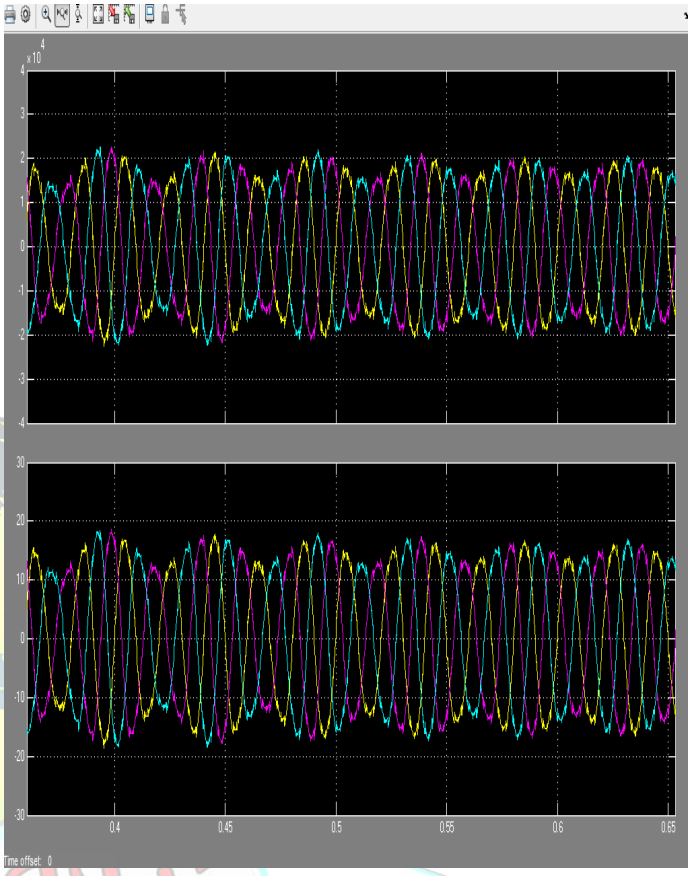
Realandreactivepowerinput:



Output Voltage and Output Current :



Real and Reactive Power Compensation

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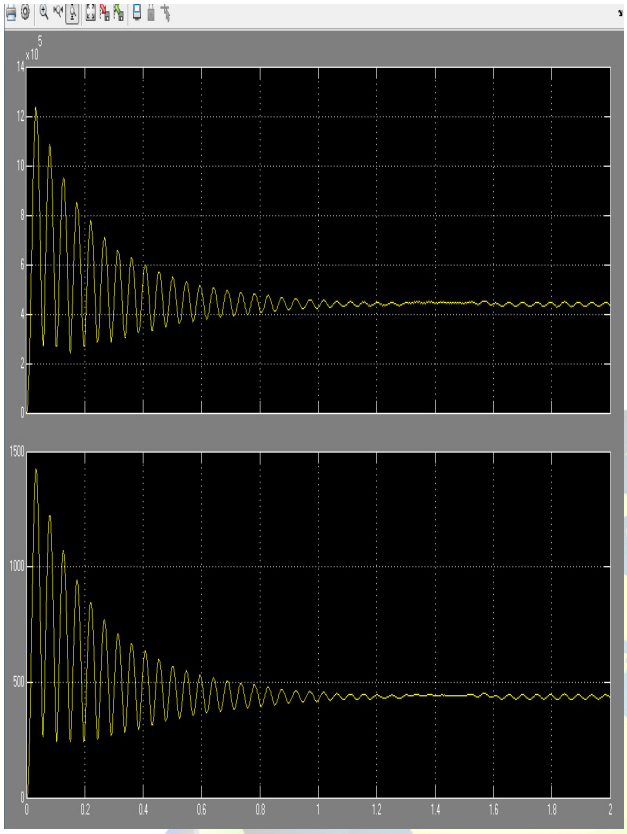
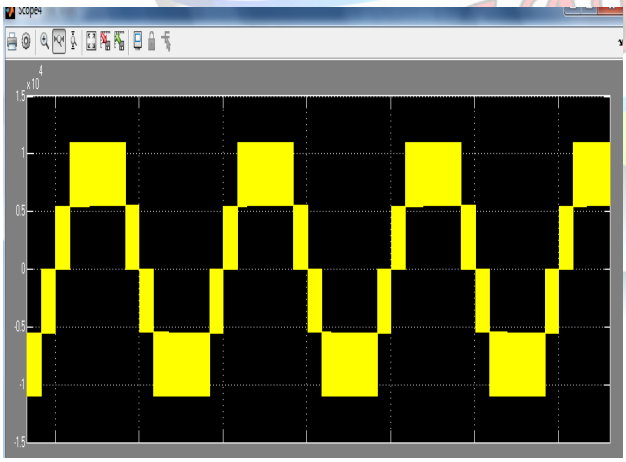


Five level:



CONCLUSION

DC-link voltage antithesis is one of the above issues in cascaded inverter-based STATCOMs. In this paper, a simple var compensating arrangement is proposed for a cascaded five-level inverter-based multilevel inverter. The arrangement ensures adjustment of dc-link voltages of inverters at absurd levels and acknowledging adeptness compensation. The achievement of the arrangement is accurate by simulation and experimentations beneath counterbalanced and agee voltage conditions. Further, the could cause for alternation if there is a change in advertence accepted is investigated. The activating archetypal is developed and alteration functions are derived. Arrangement behavior is analyzed for assorted operating conditions. From the analysis, it is accepted that the arrangement is a non minimum appearance type, that is, poles of the alteration action consistently lie on the larboard bisected of the -plane. However, zeros about-face to the appropriate bisected of the -plane for assertive operating conditions. For such a system, oscillatory alternation for top ambassador assets exists.

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