ABSTRACT:

The energy storage devices are better in a motor drive system. The power distribution strategy for energy source, and energy storage, electric motor under various operation modes. This paper develops energy storage not implementing harmonic compensation in whole operating condition, also consisting peak power during acceleration and absorbing regenerative power during deceleration, while comparing the PSMM we can obtain the better response under different operation modes.

Index Terms:
PMSM, Cascaded MLI, Segmented Energy Storage, Regenerative Control.

I. INTRODUCTION:

For the higher half of the twentieth century electrical (EVs) are through of designed developed to suit a spread of application from construct cars to advanced military vehicles. The latest enhancement au fait systems, transducers and amp instrumentation on and good vehicles technology square measure enabling vehicles to be a lot of machine controlled. Some states have required rules proposing a minimum range of cars with zero emission which may be set by the EVs MLI topologies used within the motor drive trade to run induction machine prime power and high voltage configuration this can be devides. Neutralpoint clamped converter (NPC) MLI, Fixed capacitance (FC) MLI, cascade h-bridge (CHB) MLI, catered to a decent kind of application. The CHB MLI is probably only fairly multilevel converter where the individual energy sources (capacitors, batteries etc) square measure typically totally isolated DC source. The MLI may be a distinctive style of electrical converter that’s standard for top power application that doesn’t essentially want stringing along varied power source to use high voltage.

II. PROPOSED SYSTEM:

II. POWER DISTRIBUTION STRATEGY AND SYSTEM DESCRIPTION:

The cascaded H-Bridge (CHB) MLI may be cascaded of H- Bridge or H-Bridge in a very series configuration. A CHB MLI consists of a string of H-Bridge electrical converter units in every of its three phases. Associate degree example of a CHB MLI. One H-Bridge converter, one section full bridge electrical converter employed in unipolar PWM. Advantages are the series structure permits a ascendible, modularized circuit layout and packing since every bridge has a similar structure. Needs minimum range of parts considering there are not any additional clamping diodes or voltage equalization capacitors. A very flexible ability is achieved because the modulator in the system allows a racked up structure. The main inverter and auxiliary inverter respectively for example large number of cells may help to increase power quality and required power compensation capability. Although it also leads to an extra device count, a complicated control system with high cost.

Fig 1. Proposed cascaded multilevel inverter based motor drive with segmented energy storage
III. AUTONOMOUS POWER REGENERATIVE CONTROL SYSTEM:

According to management control ways in which are loosely divides into scalar and vector management ways, in scalar management depends on relationships valid in steady state, alone magnitude and frequency of voltage, current and flux linkage house vectors area unit controlled. The vector management depended flexible and general management philosophy. It's supported relations for dynamic states, not alone magnitude and frequency but in addition quick position of voltage, current and flux house vector area unit controlled. This vector management acts on the positions of the house vectors and provides their correct orientation every in steady state and through transients. The most accepted technique spoken as field oriented management or vector management and offers the induction motor an PMSM and this approach is explored.

At intervals the vector management methodology the equation governing the motor area unit reworked into an organization that rotates in synchronization with the rotor flux vector with new co-orientation referred to as field co-ordinates. When compared with IMs, the initial constant value of computer flux in PMSMs is not zero and is instead keen about the rotor position in motion sensor less PMSM drives. The initial position of the router is not noted and this sometimes causes troubles like initial backward rotation force ripple and problems with synchronous for non silent (with surface mounted magnets) PMSMs reliable position estimation is harder than for silent (with buried or inserted magnets) construction where the initial position are calculated terribly very definitive manner by exploiting the bowed inductions variation for a non silent PSM to start with high weight lots and essay low pass filter instead of a preinstruments at intervals the flux skilled is also used. This solves the matter of flux initial conditions.

The PSMM (PHASE SHIFT MODULATION METHOD) this method can apply very well to CHB inverters a brief description about these methodology in general a m-level MLI then triangular carries (m-1) the PSMS may be higher illustrated by associates degree.

IV. MATLAB CASE STUDY AND SIMULATION RESULTS:

Fig 3: Proposed cascaded-multilevel-inverter-based motor drive with segmented energy storage.

Fig 4: Proposed control strategy

Fig 5: Proposed power flow control system
The ordinary and proposed MATLAB/Simulink models were produced for PMSM. The motor is worked in consistent torque of 10N.m mode. In the outlined model for execution diverse operation modes by utilizing self-sufficient power regenerative control system and store recouped regenerative energy in a energy using so as to stockpile UC’s.

**Fig 6: Simulation results of proposed motor drive Speed response**

The rate dynamic reaction when the pace charge N*e changes from 0 to 2000 r/min at 0.1 s and afterward back to 1000 r/min at 0.4 s. The genuine rate Ne takes after N*e quick and easily.

**Fig 7: Simulation results of proposed motor drive six capacitor voltages of three phases**

In this capacitor voltage begin before speeding up mode 0V after quickening it will comes to 75V, amid release it will comes to 75V to 51.5V, amid deceleration period capacitor regenerating the regenerative energy from the PMSM, so the capacitor voltage build 51.5V to 62.5V.

**Fig 8: Simulation results of proposed motor drive Pmotor&PStorage**

In this power convey by electric motor and energy storage PMotor is expansion 4200W to 6800W PStorage Decrease - 3500W to - 600W after deceleration it will reaches to typical position.

**Fig 9: Simulation results for PSource**

In this power stream between the energy storage and electrical motor since there is no overshoot voltage, quick element reaction, it can be connected for substantial obligation electric vehicle alongside alternate applications to enhance the system solidness and power quality.
PMSM, so the capacitor voltage builds up from 51.5V to 62.5V. During the regenerating phase, the regenerative energy from the motor is recovered, raising the capacitor voltage to 75V to 51.5V amid deceleration. Upon quickening, the voltage may reach up to 75V, and upon release, it returns to 0V. In this mode, capacitor voltages are maintained before speeding up for quick and easy acceleration.

The motor is operated at a nominal speed of 1000 r/min at 0.4 s. The genuine speed $N_e$ follows the equation $N_e = N_e^* + e$, where $N_e^*$ changes from 0 to 2000 r/min at 0.1 s and then decreases back to 1000 r/min. The rate dynamic response when the speed charge $N_e^*$ is increased from 0 to 2000 r/min at 0.1 s is observed. The speed responds almost immediately, and the system settles within a few milliseconds, ensuring smooth operation.

In this speed control system, the energy storage capacitors UC's are utilized to recoup regenerative energy in a power steering system and store it for execution diverse operation modes by utilizing the self-consistent torque of 10N.m mode. In the outlined model, the energy storage capacitors are used to smooth out voltage fluctuations and improve the system's stability and power quality. The simulation results for the proposed motor drive system with a mesmeric energy storage are shown in Fig. 8. Additionally, Fig. 9 illustrates the simulation results for the power source.

V. CONCLUSION:

This paper has planned a cascaded MLI based motor drive system with mesmeric energy storage parts. In the planned motor drive system, the energy storage has been designed not solely to supply harmonic compensation but additionally to be capable of its regenerative energy throughout the swiftness mode and reapplying this energy throughout acceleration transients. A power distribution strategy between the energy suppliers and energy storage and therefore the motor has been developed and enforced by a planned autonomous power regenerative system. During this system, the voltage equalization management of the energy storage has been demonstrated to be very important for power distribution system stability and dependability. It seems that the planned motor drive system is applied to heavy-duty electric vehicle and alternative application to boost system efficiency, and dynamics and power quality.

REFERENCES:


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