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SCHEMING OF EFFECTIVE Z-SOURCE INVERTER FOR VEHICULAR APPLICATIONS

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ABSTRACT:

The Z-source inverter is extremely advantageous above established inverters and Z-source inverter is employed in the entire applications of power conversion. Various methods of Pulse-width modulation are created to manage inverters. The entire conventional methods of Pulse-width modulation are used to manage Z-source inverter. Our work introduces a maximum constant boost-control by means of third harmonic injection method that is intended for Z-source inverter that attain highest voltage boost for a stable modulation index. The proposed technique is more beneficial pulse-width modulation control among other pulse-width modulation control techniques. This technique of maximum boost control is suitable for relatively high output frequency, however in this technique of maximum constant boost control designing of Z-source network is independent of output frequency as well as determined only by switching frequency. This method attains maximum voltage gain while constantly keeping shoot-through duty ratio stable.

Keywords: Z-source inverter, Pulse-width modulation, Third harmonic injection, Maximum constant boost-control, Voltage gain.

1. INTRODUCTION:

Techniques of Pulse-width modulation control decreases harmonic distortion in output signal and improves inverter performance. Inverters are the converters for dc to ac systems. There are two types of conventional inverters that are on the basis of input source and they are Voltage-source inverter and Current-source inverter which are used in industries for changeable speed drive as well as many other applications [1]. For the inverters of voltage source and current source on/off time of switching devices is managed by means of application of control voltage towards control terminal. . In earlier works, in the majority of industries inverters of voltage source and current source are used in variable speed drives. The novel impedance-source power inverter was in recent times created, removes the entire problems of conventional inverters of voltage source and current source. The power source may be moreover voltage source or else current source. In the recent times, Z-source inverter is introduced as novel power conversion notion which is mostly developed for vehicular applications of fuel cell. The Z-source inverter includes an exceptional impedance system that couple converter main circuit towards power source, load for provision of exceptional features that are not observed in traditional inverters of voltage source and current source. Impedance network includes two inductors as well as two capacitors that are associated to each other and forms second order filter network [2]. Traditional techniques of Pulse-width modulation control that controls Z-source inverter are maximum boost control, simple boost control along with maximum constant boost control. In our work we present maximum constant boost-control by third harmonic injection method that is intended for Z-source inverter that attain highest voltage boost for a stable modulation index. The maximum constant boost control technique overcomes restrictions of simple boost as well as maximum boost control techniques. In this technique Z-source network design is independent of output frequency as well as determined only by switching frequency.

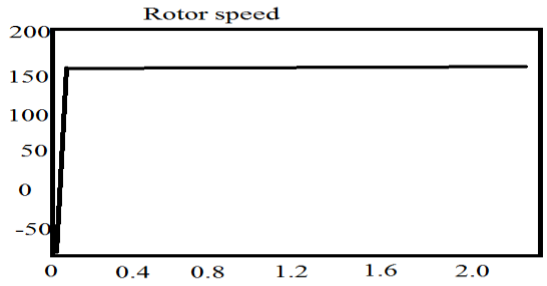

Fig1: An overview of speed variation of induction motor

2. METHODOLOGY:

The conventional techniques of Pulse-width modulation inverter topology enforce high voltage stress towards switching devices and limit motor's unvarying power speed ratio. In Z-source inverter besides six traditional active states as well as two zero state, consists of an additional state of shoot-through in which both upper as well as lower switching devices within a single arm or three arms carry out at the same time, thus produce short circuit all across load. Hence output voltage across load remains zero in shoot-through state and therefore effect of shoot-through state is similar as traditional zero state. In the inverter of Z-source part of zero state is converted to shoot-through state, in which upper as well as lower switching device of one or the entire three arms of bridge inverter carry out at the same time [3]. This inverter includes an exceptional impedance system that couple converter main circuit towards power source, load for provision of exceptional features that are not observed in traditional inverters of voltage source and current source. The Z source network makes shoot-through zero state promising and this state provides buck-boost feature to inverter. Hence for managing of sinusoidal output voltage, active-state duty ratio is preserved similar and zero states turn into shoot-through state. Z-source converter overcomes limitations of conventional inverters of voltage source and current source. We present maximum constant boost-control by third harmonic injection method that is intended for Z-source inverter that attain highest voltage boost for a stable modulation index. This method is more advantageous pulse-width modulation·control among other pulse-width modulation·control techniques. Methods of maximum constant boost control get rid of low-frequency ripples in inductor current as well as capacitor voltage by means of managing of shoot-through duty cycle stable, and reduce voltage stresses of switching devices simultaneously. Maximum constant boost control attains maximum voltage gain while constantly keeping shoot-through duty ratio stable [4]. The proposed technique of maximum boost control is appropriate for comparatively high output frequency, however in this technique of maximum constant boost control Z-source network design is independent of output frequency as well as determined only by switching frequency.

3. AN OVERVIEW OF PROPOSED MAXIMUM CONSTANT BOOST CONTROL TECHNIQUE:

Z-source inverter produces an output voltage which is superior to dc input voltage by means of controlling shoot-through duty ratio that is not possible for established systems. Pulse-width modulation control that controls Z-source inverter are maximum boost control, simple boost control along with maximum constant boost control. The simple boost control technique is simple however construct superior voltage stresses all across the devices of switching. In the technique of maximum boost control voltage stress all across switching devices is decreased on the other hand impedance network designing depends on output frequency. The proposed system with or devoid of third harmonic injection technique overcomes restrictions of simple boost as well as maximum boost control techniques. We present maximum constant boost-control by third harmonic injection method that is intended for Z-source inverter that attain highest voltage boost for a stable modulation index. Maximum constant boost control removes low-frequency ripples in inductor current as well as capacitor voltage by means of managing of shoot-through duty cycle stable, and reduces voltage stresses of switching devices concurrently. For reducing volume as well as cost, shoot-through duty ratio have to be kept stable and at the same time, a superior voltage boost for any specified modulation index is required to decrease voltage stress across switches. The proposed method of maximum constant boost control attains maximum voltage gain while constantly keeping shoot-through duty ratio stable. The Z source network makes shoot-through zero state promising and this state provides buck-boost feature to inverter. The proposed system with third harmonic injection technique is devised to construct maximum constant boost while reducing of voltage stress. Maximum constant boost control technique is more beneficial pulse-width modulation control among other pulse-width modulation control techniques [5]. Third harmonic injected pulse-width modulation with shoot-through as well as control method refers to maximum constant boost control by third harmonic injection. The third as well as superior harmonic components are injected into essential to decrease harmonic distortion in output waveform. Maximum boost factor is

obtained while maintaining it stable continually.

4. CONCLUSION:

Z-source converter overcome conceptual as well as theoretical barriers and restrictions of conventional inverters of voltage source and current source and makes available a superior power conversion notion. The earlier methods of pulse-width modulation inverter topology implement high voltage stress towards switching devices and limit motor's unvarying power speed ratio. Z-source inverter is a novel power conversion concept which is mostly developed for vehicular applications of fuel cell. In our work we introduce a method of maximum constant boost-control by third harmonic injection that is intended for Z-source inverter that attain highest voltage boost for a stable modulation index. This technique of maximum constant boost control attains highest voltage gain while constantly keeping shoot-through duty ratio stable and it is more advantageous pulse-width modulation control among other pulse-width modulation control techniques. The proposed technique throw out low-frequency ripples in inductor current as well as capacitor voltage by means of managing of shoot-through duty cycle stable, and reduce voltage stresses of switching devices simultaneously. Maximum boost control is moreover apt for reasonably high output frequency, however in this technique Z-source network design is independent of output frequency as well as determined only by switching frequency.

REFERENCES

[1] K. Srinivasan and Dr. S. S. Das, "Performance Analysis of a Reduced Switch Z-Source Inverter fed IM Drives", Journal of Power Electronics, Vol. 12, No. 2, May/June 2010.

[2] Omar Ellabban, Joeri Van Mierlo and Philippe Lataire, "Comparison between Different PWM Control Methods for Different ZSource Inverter Topologies" IEEE Transactions on industry application, May/June 2010

[3] K.Niraimathy, S.Krithiga, "A New Adjustable-Speed Drives (ASD) System Based On High-Performance Z-Source Inverter", 978-1-61284-379-7/11 2011 IEEE, 2011 1st International Conference on Electrical Energy Systems

[4] Miaosen Shen, Jin Wang, Alan Joseph, Fang Zheng Peng, Leon M. Tolbert, and Donald J. adams, "Constant Boost Control of the Z-Source Inverter to Minimize Current Ripple and Voltage Stress", IEEE Transactions on industry application vol. 42, no. 3, May/June 2006

[5] S. Rajakaruna, Member, IEEE and Y. R. L. Jayawickrama, "Designing Impedance Network of Z-Source Inverters" IEEE Transactions on industry application.