A Project Report on

Z – SOURCE INVERTER FOR MOTOR DRIVES

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ABSTRACT

This work presents a Z-source inverter system and control for general-purpose motor drives. The Z-source inverter system employs a unique LC network in the dc link and a small capacitor on the ac side of the diode front end, providing unique features that cannot be obtained in traditional voltage source inverters. The Z-source inverter overcomes the conceptual and theoretical barriers and limitations of the traditional voltage source inverter and provides a novel power conversion concept. By controlling the shoot-through duty cycle, the Z-source can produce any desired output ac voltage, even greater than the line voltage. As a result, the new Z-source inverter system provides ride-through capability during voltage sags, reduces line harmonics, improves power factor and reliability, electromagnetic interference noise, low switching stress power , low common mode noise and extends output voltage range. Analysis, simulation, and experiment are carried out to demonstrate these new features.

Z Source inverters have recently been proposed as an alternative power conversion concept for adjustable speed AC drives with both voltage buck and boost capabilities as they allow inverters to be operated in the shoot through state. It utilizes an exclusive Z – source network to link the main inverter circuit to the power source . This proposed strategy considers the inverter as a single unit and greatly reduces the complexity and cost when compared with traditional systems.

Besides that the choice of the modulation method has a high influence on the power losses of the Z-source inverter as well. Based on the calculated power losses the efficiency and the installed semiconductor power are investigated and compared for different input voltages.