

POWER QUALITY IMPROVEMENT IN A ZETA CONVERTER FOR BRUSHLESS DC MOTOR DRIVES

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Abstract

The speed of the BLDC Motor is controlled by using the MOSFET switches. The proposed drive is intended to operate over a wide range of speed control while improving power quality at alternating current mains. The three-phase input to the BLDC motor is provided by a three-phase inverter operating in conduction mode 120° . The zeta converter is used to change the input DC Voltage to the three-phase inverter, which changes the output voltage of the three-phase inverter, which changes the speed of the BLDC Motor. The Zeta converter operates in the discontinuous induction current mode. Using a PIC controller, the output voltage of zeta is varied by varying the duty cycle of the zeta converter. Permanent magnet brushless DC motors (PMBLDC) find wide applications in industries due to their high-power density and ease of control. These motors are generally controlled using a three-phase power semiconductor bridge. For starting and the providing proper commutation sequence to turn on the power devices in the inverter bridge the rotor position sensors required. Based on the rotor position, the power devices are commutated sequentially every 60° . To achieve desired level of performance the motor requires suitable speed controllers. In case of permanent magnet motors, usually speed control is achieved by using proportional-integral (PI) controller. The Power Quality Improvement in a ZETA Converter for Brushless DC Motor Drives is shown in Figure 1.

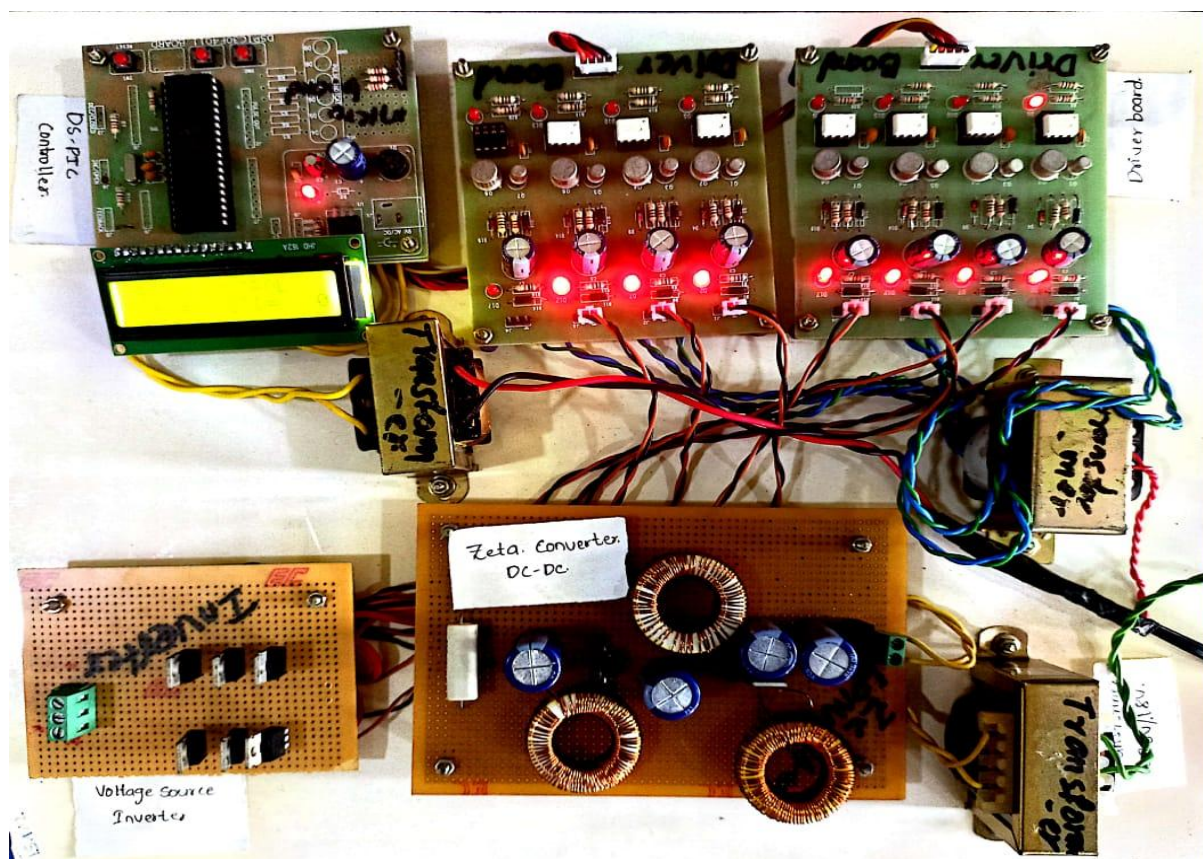


Figure 1. Power Quality Improvement in a ZETA Converter for Brushless DC Motor Drives