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Analysis of PFC BL-SEPIC Converter Based Intelligent Controller Fed BLDC Motor Drive

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Abstract : This paper presents comparative study of various Intelligent controllers for Bridgeless-Single Ended Primary Inductance Converter (BL-SEPIC) fed Brushless DC (BLDC) motor Drive. By adjustment of the DC link voltage of the VSI, the speed of the BLDC motor can be controlled. The voltage source inverter is used as an electronic commutator of PMBLDCM. The Bridgeless PFC SEPIC Rectifier performs power factor correction and DC voltage control in single stage using only one controller. The most commonly used controller for the speed control of BLDCM is Proportional Integral (PI) controller. Further, ANFIS controller has the ability to automatically learn and adapt with a state of plant. Also, we design and implement sliding mode controller (SMC) and its performance is compared with PI and ANFIS controller to show its capability to track the error and usefulness of Sliding mode controller in control applications. The sliding mode control technique for permanent magnet brushless DC motor is used to improve its dynamic performance with high accuracy. The Performance of the converter is analyzed and the results are discussed to arrive at the best suited controller. The drive has been simulated using the MATLAB/Simulink environment and the performance has been studied.

Key Words : Bridgeless-SEPIC, Permanent Magnet Brushless DC Motor (PMBLDCM), Proportional Integral (PI) Controller, ANFIS Controller, Sliding Mode Control (SMC), Power Factor Correction (PFC), Voltage Source Inverter (VSI).

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