Improved SEPIC Converter for PFC Correction in Industrial AC And DC Drive Application

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Abstract

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In this context, examinations and evaluations of an Improved SEPIC Converter, powered Brushless DC motor (BLDC) drive is presented. The Improved SEPIC (Single-Ended Primary-Inductor Converter) minimum signal and circuit analysis evaluates variations at resonance frequencies. Also included is a control strategy for controlling the DC link voltage. It is recommended to use a bridgeless AC-DC power factor in power supply and battery chargers. The BLDC motor may function in a variety of phases, but the most popular is the 3-phase since it is more effective and produces very little torque. The motor needs the right speed controllers to work at the optimum level. The major speed management approach used with BLDC motors is PI control with hysteresis or pulse width modulation shifting. The Hall detector system detects the velocity of the BLDC motors. Hysteresis current control (HCC) is one of the most basic PWM techniques. The system is strengthened by utilizing PWM to combine the benefits of PWM with the hysteresis controller. Using MATLAB - SIMULATION, the different dynamic properties of BLDC motors, including speed, current, and back emf are analyzed. The Efficiency of the Improved SEPIC Converter is 98.7% respectively.

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Contents

I. INTRODUCTION

A crucial component of commercial battery chargers is the AC-DC PFC converter. To fulfil the regulatory criteria of input current, output voltage, and PFC implementation in these applications is crucial [1]. If the right control is applied, the boost PFC topology realizes virtually unity power factor. Contrary to the boost PFC converter, bridgeless boost converter topologies do not use a diode bridge rectifier [2]. As a result, the input rectifier bridge's conduction losses and related heat management problems are decreased by the bridgeless converter. Inrush currents happen when the PFC circuit is connected to an input voltage in these converters that has a peak bigger than the instantaneous DC voltage [3]. The complexity and extra circuitry needed to address these issues in boost-derived converters typically compromise system efficiency. As a result, these converters need inrush current for practical applications and to guard against damage when connected to AC power.

Authors

Figures

References

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