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Abstract
A novel pulse-width modulated (PWM) single-phase line-interactive uninterruptible power supply (UPS) based on the small dc bus capacitor is presented. The proposed system is made up of an ac chopper which includes a diode rectifier, a boost switch, a charger and an inverter. It has the features of a small dc bus capacitor, small input and output inductors, and low switching loss. It can regulate the sustained voltage swells and sags by controlling the corresponding power switches in the normal mode, and can be switched to back-up mode when the utility voltage fails. Regardless of voltage swells or sags, there is only one power stage switching in PWM status, therefore the proposed topology gives high efficiency. Theoretical analysis has been achieved with detailed analysis. Case study is demonstrated by means of a 1kVA prototype experiment to prove its performance and effectiveness.
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