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Asymmetrical ac motor driven by multiphase-multilevel inverter

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Presentation focused on a novel multiphase-multilevel ac motor drive system much suitable for low-voltage, high-current power applications. In specific, six-phase asymmetrical induction motor with open-end stator winding configuration, fed from four standard two-level threephase voltage source inverters (VSIs). Attention will be also focused on novel synchronous reference (rotating) frame control algorithm shares the total dc source power among the 4 VSIs in each switching cycle with three degree of freedom. Precisely, first degree of freedom concerns with the current sharing between two three- phase stator windings, second and third relates to voltage sharing between four inverters. Complete model of whole ac motor drive based on three-phase space vector decomposition approach will be delivered based on development in PLECS – numerical simulation software working in MATLAB environment along with closed control aspect. Further, simulation results will be discussed in detail to show symmetrical and asymmetrical, power sharing conditions. Finally, focuses on hardware prototype model implementation of multiphase-multilevel inverterwith two passive three-phase open-winding loads based on TMS320F2812 DSP controller.

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Study of four wave mixing effect in the nonlinear fiber and its applications

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This report presents a comprehensive study of the four wave mixing (FWM) effect in the highly nonlinear fibre (HNLF) and their applications. The nonlinearity parameters such as zero-dispersion wavelength (ZDW), chromatic dispersion (CD) and nonlinear coefficient of HNLF has successfully investigated by using several FWM techniques. Results from all techniques have been achieved approximately similar to the manufacturer specification. Based on these parameters, a good agreement between experiments and numerical has been obtained. This characterization is important for nonlinear applications such as wavelength conversion, fibre optic parametric amplifier (FOPA) and multiwavelength fibre laser. Wavelength conversion is a key for wavelength division multiplexed (WDM) networks. Wavelength converter based on HNLF is promising candidates for implementing wavelength conversion. This report presents a thorough investigation of new configurations of the wavelength converter generation by using degenerate case and non-degenerate case of FWM effect in nonlinear media. Most of wavelength conversion configuration used self-constructed dual-wavelength fibre laser as a signal and pump sources due to compact size as well as compatible with current telecommunications system. The other application reported in this report is fibre optical based parametric amplifier (FOPA). The novelty of this configuration used is a ring cavity as opposed to the commonly used method of linear cavity. This configuration reduces the required pump power for the amplifications of the signal and also the generation of the idlers. The last application reported in this report is a stable multiwavelength fibre laser utilizing the FWM effect in HNLF is proposed and demonstrated. The multi-wavelength fibre is based on the ring cavity configuration, and utilizes a low power erbium doped fibre amplifier (EDFA) as a gain medium to generate 11 lines in the range of 1582 nm to 1600 nm and a SNR of 43 dB.

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