

Article Abstract

Title:	Carrier-based pulse width modulation technique for a three-to-five phase matrix converter for supplying five-phase two-motor drives
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Abstract:	Multi-phase (more than three-phase) converters are required mainly for feeding variable speed multi-phase drive systems. This paper discusses one such solution by using direct ac-ac converter that can be used to supply a five-phase two-motor drive system. Matrix converter based two-motor drive system is presented for the first time in this paper. Two stator windings of two five-phase machines when connected in series/parallel while the rotors may be connected to different loads are called series/parallel-connected two-motor drive. Appropriate phase transposition is introduced while connecting the series/parallel stator winding to obtain decoupled control of the two machines. This paper proposes simple carrier-based Pulse width modulation (PWM) technique of three-phase to five-phase matrix converter supplying series-connected five-phase AC machine drive system. The developed modulation technique is based on the comparison of high frequency carrier signal with the input voltages, similar to the one used in voltage source inverter. Although carrier-based scheme is widely employed for control of voltage source inverter, it is very recently being used for a matrix converter. The similar concept is extended in this paper for controlling a three-phase to five-phase matrix converter. The major aim of the PWM is to generate two independent fundamental frequency components that will subsequently control two series/parallel connected five-phase motor. The viability of the proposed control techniques is proved using analytically and simulation approach.
Keywords:	Carrier-based PWM, Matrix converter, modulation, five-phase, AC machine, drive