

Reducing Total Harmonic Content of 9-Level Inverter by Use of Cuckoo Algorithm

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Abstract : In this paper, a novel procedure to find the firing angles of the multilevel inverters of supply voltage and, consequently, to decline the total harmonic distortion (THD), has been presented. In order to eliminate more harmonics in the multilevel inverters, its number of levels can be lessened or pulse width modulation waveform, in which more than one switching occur in each level, be used. Both cases complicate the non-algebraic equations and their solution cannot be performed by the conventional methods for the numerical solution of nonlinear equations such as Newton-Raphson method. In this paper, Cuckoo algorithm is used to compute the optimal firing angle of the pulse width modulation voltage waveform in the multilevel inverter. These angles should be calculated in such a way that the voltage amplitude of the fundamental frequency be generated while the total harmonic distortion of the output voltage be small. The simulation and theoretical results for the 9-levels inverter offer the high applicability of the proposed algorithm to identify the suitable firing angles for declining the low order harmonics and generate a waveform whose total harmonic distortion is very small and it is almost a sinusoidal waveform.

Keywords : evolutionary algorithms, multilevel inverters, total harmonic content, Cuckoo Algorithm

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