

DOI: <https://doi.org/10.15407/techned2019.05.027>

SYNCHRONOUS BALANCED REGULATION OF MULTIPHASE SYSTEM BASED ON MODULATED DIODE-CLAMPED INVERTERS

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 5, 2019 (September/Oktobor)
Pages	27 - 35

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Abstract

Investigation of six-phase drive system on the basis of four diode-clamped inverters, regulated by the modified control and modulation algorithms providing both power balancing capability and voltage symmetries in system, has been done. System circuit consists of two groups of two inverters, supplying a six-phase open-end winding asymmetrical induction motor. Each diode-clamped inverter is connected across the open-end of two three-phase stator windings. The developed control and PWM schemes and techniques insure required power sharing ratios between four insulated dc sources due to special control correlations with such functions, as coefficients of modulation of inverters and magnitudes of voltages of dc sources. Mutual comparison of behavior of system with two basic schemes of synchronous pulsewidth modulation has been executed. Analysis of harmonic composition of basic voltages of multi-inverter system proves the fact, that for the all analyzed control modes, connected with balanced operation of drive under different conditions, voltage waveforms have symmetry for any control regimes, including control modes with fractional frequency ratios between switching frequency of inverters and fundamental frequency of system, with absence in its spectra of undesirable subharmonics (of the fundamental frequency). References 25, figures 5, tables 2.

Key words: voltage source inverter, induction motor with open-end windings, modulation strategy, voltage spectra.

Received: 29.03.2019

Accepted: 07.05.2019

Published: 01.08.2019

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