

ANNOTATION

In the dissertation work, an electric drive with frequency-current control based on an asynchronous motor with a phase rotor is considered.

Modern industrial production requires the development and implementation of energy-saving and energy-efficient technologies. This task is usually solved by the introduction of systems of an adjustable electric drive, built on the basis of an asynchronous motor with a squirrel-cage rotor (AMSCR) and powered by a frequency converter (FC) operating in the mode of an autonomous voltage inverter (AVI). However, this electric drive system has a number of disadvantages, namely: with any control law, the sliding energy is released in the motor, and the rotor current has a demagnetizing component, the output voltage of the inverter has a pulse character with steep fronts of the rise and fall of the voltage pulse, which adversely affects the insulation of the motor and leads to its premature aging. The elimination of these shortcomings is possible in an electric drive based on the AMSRR, operating according to the scheme of a dual-power machine (DPM) with separate power supply of the stator and rotor windings from power converters based on an autonomous current inverter (ACI), using classic FC or using new circuit solutions.

Algorithms for controlling a synchronized electric drive with converters in the stator and rotor circuits according to the criterion of the minimum total power loss in copper and steel of the engine are proposed; an approximation of the working section of the magnetization curve is proposed, which makes it possible to simplify the description while maintaining the accuracy of the approximation.

A three-phase AIT circuit is developed, which differs from the known presence of additional damping capacitors, as well as better indicators of nonlinear distortion coefficients in voltage and current; a system of scalar frequency control of synchronized AMSRR is developed. A virtual model of the electric drive has been developed so that simulation, calculations and analysis of the results obtained are carried out using the Matlab application software package. The results confirmed the validity of the theoretical studies presented in this dissertation.