SIMULATION OF AND TORQUE-SPEED CURVES OF COMPENSATED INDUCTION MOTOR IN MATLAB SIMULINK SOFTWARE

V. Gavriluk

The development of computer technology, especially the emergence of specialized software packages helped to facilitate the resolution of complex algebraic equations that describe the physical processes of energy conversion. His further developed two extreme approaches to the theory of electromechanical energy conversion, field theory, based on Maxwell's equations and theory circles - on the basis of Kirchoff equations.

Given the complexity of solving the field equations and a large number of assumptions successful electric car modeled using equations, based on the theory circles. With this method, with sufficient accuracy for research and the analysis of established transients asynchronous motors (AM). The implementation of this method in mathematical MATLAB Simulink environment greatly simplified how AD simulation and visualization of the results. Simulation modes of modern engines in the specialized application packages is an important scientific task, especially in the modernization and manufacture new series DR. The simulation results allow to analyze engines when changing their parameters and operating modes without making expensive physical models.

The purpose of research - development of Simulink-models compensated induction motor, construction workers and its mechanical characteristics.

Materials and methods of research. New terms of research of dynamic modes and transients, AD is the internal capacitive compensation, or so-called compensated induction motor (KAD). Simulation of the engine based on the equations of equilibrium electrical circuits stator and rotor stacked on the theory of circles.

The program MATLABisnuye standard library elements Sim Power Systems. One such element is built into the program model of AD. But given the KAD design features, in particular the spatial shift between its pivobmotkamy and availability of electric capacity, a study of this engine with a standard element is impossible.

The objective of this work is the integration of electrical equilibrium equations of mathematical KAD environment MATLAB Simulink, which will simulate the energy conversion process in the engine, taking into account the peculiarities of its structure, and

carry out a comparative analysis of the characteristics of the engine and KAD series based on it.

Results. For programming in MATLAB Simulink using equations written in blocks of mathematical functions.

Full current KAD defined as the sum of the currents in the windings of the half.

To calculate the dynamic electromechanical processes asynchronous machine is necessary to balance the electrical system of equations of motion equations circles add the drive to the calculation of electromagnetic torque of the machine.

The resulting equation is the foundation of Simulink-model. Their solution provides a motor current in each of its phases and pivobmotok, electromagnetic torque of the engine at any point in its mechanical characteristics at a given moment and the voltage on the shaft. KAD work under load estimate for performance. For their construction need to find rotoran rotation speed, power consumption, power and point the shaft engine efficiency and power factor cosφ.

Simple calculations also exposed the power and utility of the engine, Definition KAD active power consumption is performed using the built-in Simulink block RMS. Block RMS use to determine current values sinusoidal variables with their instantaneous values.

Because the voltage and current representation of the instantaneous value, the practical interest is the definition of power factor sosφ while Simulink simulation. The idea is to determine the phase voltage and current using the Euler-Fourier formulas.

The program MATLAB Simulink algorithm that is implemented with a block Fourier, settings in which you specify the frequency and serial number of harmonics, the angle is determined.

Conclutions

The developed model enables Simulink to simulate the mechanical characteristics of asynchronous motors starting modes and assess machines. Numerical modeling allows complete analysis of the blood pressure at a variable load character based on performance. The comparative analysis on the basis of the received performance showed increase in compensated induction motor efficiency by 10-30% and 7-20% sosφ in comparison with serial asynchronous motor depending on the load current with simultaneous reduction to 5.12 %.