

УДК 621.313

Kotsur I.M.

PhD (EM), assistant professor (EM), NU “Zaporizhzhia Polytechnic”

STUDY OF THE MAGNETIC FIELD DISTRIBUTION OF AN ASYNCHRONOUS MOTOR AT DIFFERENT HEIGHTS OF THE SLOTS OF THE SHORT-CIRCUITED ROTOR

The existing methods of calculating electromagnetic fields allow to reduce the time for determining the values of mathematical data, in particular, using the finite element method. It is considered more effective, but not always simpler. A certain number of programs have been created to solve this issue.

One such program is FEMM 4.2 (Finite Element Method Magnetics). A convenient interface and ease of use allow you to quickly master the program even without special knowledge of graphic editors.

The purpose of this work is research using the FEMM 4.2 program. physics of electromagnetic processes in an asynchronous motor (AM) with a short-circuited rotor type 4A225M8U3 at different heights of the grooves of the short-circuited rotor.

The initial data for calculating the magnetic field are: geometric dimensions, characteristics of materials and environments, current densities in the windings, as well as boundary conditions that are introduced to obtain an unambiguous solution.

According to the results of the simulation of the magnetic field of AM with an increased height of the rotor grooves, the energy indicators were calculated. Losses in the rotor winding of the new design are reduced. As a result, the useful power and efficiency increase, while the total losses remain approximately unchanged.

Thus, for an asynchronous motor type 4A225M8U3, an increase in the height of the rotor groove by 32% led to an increase in their cross-section, which in turn led to an increase in the efficiency of the motor by 0.19%.

According to the results of the study of 4A4A225M8U3 using FEMM, the most accurate parameters were obtained, which more reliably reflect the actual process.

Increasing the height of the grooves of the short-circuited rotor makes it possible to increase the cross-section of the grooves of the rotor, which leads to an improvement in the energy performance of AM.