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DEVELOPMENT OF A THERMAL SUBSTITUTION SCHEME OF AN INDUCTION MOTOR

Currently, due to the widespread use of PCs, the use of temperature field method of thermal assessment has become possible both at the research stage and at the design stage of the induction motor. This allows to do without traditional methods of calculation and method of thermal scheme of replacement of thermal state of induction motor, and to pass from temperature resistances, as parameters of the thermal scheme of substitution, to geometrical conductivity of the given scheme.

Thus, the development of an adequate electro-thermal field mathematical model to obtain more accurate results of the calculation of the thermal state of induction motor is an urgent scientific and technical task.

As a result of the research the peculiarities of simulating of thermal processes in the cross section of an induction motor are considered. A mathematical electrothermal field model has been developed, which allows to

take into account the peculiarities of interconnected electromagnetic and thermal processes in structural elements of an induction motor with a squirrel-cage rotor, nonlinear properties of materials, change of states of thermal conductivity coefficients of each units of the induction motor depending on change of its temperature.

The results of field electro-thermal calculation were compared with empirical calculations for estimating the temperatures of the main and main components of the induction motor according to the methods of O.D Goldberg and I.P. Kopylova. The relative error in relation to the results of field calculation, according to the method of O.D Goldberg is 20.2%, according to the method of I.P Kopylova – 15,6%.

Thus, given the fact that the field electro-thermal model has a very accurate calculation, is a very important result and can be used at the design stage of induction motor, as an alternative way to assess the thermal state of induction motor.