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COMPARATIVE NUMERICAL-FIELD ANALYSIS OF POWER MAGNETIC LOSSES IN A DC MOTOR

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Abstract

The principles and test results of the numerical-field calculation of the power magnetic losses (PML) in electric machines are presented. The elaborated refined method is based on the search for the maxima of the values of magnetic induction in a set of mini-elements in the teeth and the yoke of the armature core, achieved during its rotation. The root-mean-square values of the magnetic induction at the indicated sections of the core as a whole are determined from the distribution of the found maxima and the PML are calculated from them. The method allows to display the calculated models of cores of any shape and practically doesn't require simplification of their geometric structure. The test implementation of the method is done on the DC motor example and relies on experimental data on the PML in it. A comparative analysis of the distributions of magnetic induction and PML is carried out in idling and load modes for armature core variants with one and two rows of axial ventilation ducts and without them. References 16, figures 9, tables 3.

Key words: DC motor, armature core, ventilation ducts, magnetic induction, magnetic power losses, numerical-field calculations, comparative analysis.

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