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EXPLICIT-POLE BRUSH-LESS GENERATOR WITH U-SIMILAR STATOR

Last few years, in modern electromechanics converter (EMC), both in motors and in generators with limited power, excitation from high-energy permanent magnets (PM) is applied all more often. A number of structural, technical and field-perfomance advantages of such EMC facilitated production increase.

Some electrical drives on the base of brush-less direct current motor were developed on the department of electric machines and apparatus in Lviv Polytechnic National University.

Amidst known constructions of stator magnetic circuits of electromechanics converter of BLDM, U-similar and pseudo-U-similar stator construction were mainly used as most rational from technology viewpoint. That construction can provide the best dynamic indexes for less inductance of dispersion and rotor reaction as a result of practically complete magnetic isolation of phases, and as a result - have more advantages [1]. However, a tooth numbers of stator in such engines must be large enough, that can profit at the use of them for EMC with relatively low speed and with large diameters.

Magnetic circuits and not identical ways of working magnetic flux, predetermine the necessity of creation of design techniques of EMC for generators, as well as for motor, which accordingly, some differ. The calculation of the magnetic system of such generator with sufficient exactness can be carried out, like, as well as engine [1], with taking into account on the initial stage only major influences.

The calculation of generator with permanent magnets consists of two parts: determination of basic sizes and checking calculation. Unlike methodologies of calculation of basic sizes of the known types of electric machines that are based on the choice of the electromagnetic loading coming from design experience, for a generator with PM on a rotor and with U-similar stator such experience is limited to.

As theoretical and experimental researches shows - relative by the geometrical sizes of tooth-pole zone of EMC for generator with modern magnets are approximately in the same limits, as well as for EMC of motors [1]. In particular, optimal values of coefficient of stator pole overlap are in limits, and coefficient of rotor pole overlap of generator - in limits.

It is possible taken into account the real distribution of magneto-motive force (MMF) on the height of PM for clarification of dissipated conductance values of PM. Distribution of MMF and magnet's dispersion fluxes can be found for a concrete construction from the decision of differential equalizations of magnetic-field by numerical methods with the help of computer. After determination of necessary maximal flux, width and length of permanent magnet, the diameter of inductor can was chosen.

Depending on the necessary area of the transversal crossing of section coil, size of U-similar elements of stator magnetic circuit are determined by the known methodologies. After pre-selection of rotor diameter, on methodology [1] specify the got values of basic sizes and in case of substantial divergence with set, repeat calculations from specified data.

Given over theoretic estimations and correlations is the methodologies of project calculation of basic geometrical sizes of generators with PM and U-similar stator construction. Results of researches of such generator, which was designed with the use of given methodology, affirm the sufficient level of adequacy.