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Analysis of the effect of changes in the geometry of a hybrid axial flux machine on its performance

Abstract. *The publication presents an axial flux machine with permanent magnets and additional electromagnetic excitation. The change in the angle between the poles on the rotor discs on the distribution of the magnetic field in the machine and its effect on the basic performance of this machine will be analyzed.*

Keywords: axial flux machine, permanent magnets, hybrid excitation, finite element method, machine performance parameters.

Research assumptions

In the search for highly efficient electric drives, researchers propose new solutions for electric machines and analyze their geometric changes [1, 2]. The subject of the research in this publication is a modification of an axial machine with a double-sloted stator and two outer discs with alternately mounted iron poles and permanent magnets. An additional excitation source is mounted in the stator yoke. The operating principle of the machine is described in the publication [3]. As part of the tests, the angle between the poles on the machine's dials will be changed. The 0-degree angle will be the arrangement where the permanent magnets are located opposite each other (Fig. 1.a), while the 30-degree angle will be the arrangement where opposite the permanent magnet on one disc will be the iron pole on the other disc (Fig. 1.b).

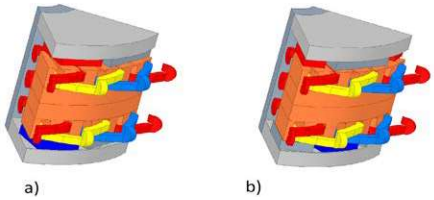

Fig.1. Axial machine with two extreme angles of displacement of rotor discs: a) angle 0 degrees, b) angle 30 degrees

Conclusion

It is assumed that a change in the angle between the poles on the rotor discs will affect the distribution of the magnetic field in the machine under study and consequently its performance parameters such as induced voltage and cogging torque.

References

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