Jaunoji energetika 2008, Kaunas, 2008 m. gegužės 29 d.
CYSENI 2008, 29 May 2008, Kaunas, Lithuania
ISSN 1822-7554, www.cyseni.com

MAGNETIC FIELD IN TOOTHED ZONE OF AN AXIAL INDUCTOR MACHINE

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ABSTRACT

The present work is devoted to research and optimization of axial inductor machines (AIM). The present machines have simple construction and high degree of reliability, owing to the absence of rotating windings and sliding contacts. As a result of that, the advantages of AIM are: their popularity as generators in wind-driven power plants, in the systems of electrical supply of trains, planes and ships.

Theory of electric machines is based on the research of magnetic fields using analytical methods in the air gap of the machine, but for the present time there are some rough assumptions: magnetic field in the gap is flat-parallel; the surface of an armature is smooth and flat, magnetic permeability of steel is unchanged.

Simple constructions AIM have an electrical magnetic scheme which is absolutely different from other synchronic machines and their magnetic field has expressively three-dimensional character. However, with the help of some simplifications, the solution can be reduced to two two-dimensional tasks: field in the active zone (the core of the stator, rotor and the main air gap) is flat-parallel, but outside the bounds of the active zone can be received as axis symmetrical. The complexity of modeling of magnetic field in the active zone of AIM lies in the necessity of modeling of missing resource of field stimulation, as the coaxial coil of stimulation is situated in the space between sets of the stator or the rotor.

The work presents the results of modeling of magnetic field in the toothed zone of an axial inductor machine with the account of real geometry and concentration of the magnetic chain by using "QuickField" program.