RESONANT MODES IN COMPENSATED INDUCTION MOTOR

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The need for asynchronous motors with reduced consumption of reactive power led to the emergence compensated induction motors (KAD). Features of the structure of these motors, namely, the presence of inductive (motor winding) and both capacitive elements in certain modes of operation can lead to resonances. At resonance may increase the current in the windings of the motor, leading to overheating and the release of their last down. Existing works on KAD not reveal the problem of the origin of resonances. Therefore, this issue is now urgent and requires thorough investigation.

The purpose of research - the study of KAD for acquisition of resonant modes in its windings in different modes.

Materials and methods research. Object is compensated resonant processes in induction motors. The task was carried out based on the methods of circuit theory.

Results. It is known that the resonant mode of operation is one in which the input impedance is purely active. Since the stress response occurs when a series connection of L, C elements, it is possible for additional half winding engine. With the current condition of resonance in half winding should coincide in phase with the voltage output.

Vector full stator current KAD should be as close to the motor voltage vector, provided least reactive power consumption KAD.

It is known that in the process of starting under load KAD need several times more capacity than a capacitor with a capacity for nominal mode, and start the process followed by the change of EMF half winding stator.

This changes both active and reactive components of the motor current during its launch.

In the resonance voltage on the additional half winding not exceed 0,99Un, their nominal value. This is true for the main half winding because it has the same value of active R1 and X1 inductive resistances as more and resonance it may be in the process of acceleration due to the influence of capacitive current through the primary link mutual inductance half winding additional.

Resonance currents in parallel half winding KAD by definition come when motor current match in phase with the voltage.

This mode of operation KAD very effective because all the reactive power required to provide his excitement C_{Δ} condenser and the engine will consume network of highly active power.

However, in practice in nominal mode KAD operates in close to resonance. In this mode, the total motor current will not be purely active, but in the process of KAD possible load changes, which will cause some redistribution of currents in its half winding that will match the motor current in phase with the voltage of its power and the emergence of resonance currents.

Conclusions

As a result of studies found that resonance phenomena that occur in compensated induction motors do not affect its performance. Resonances voltage during engine start and current resonances at their nominal modes do not lead to an increase in current and voltage in its half winding due to low quality factor contours KAD.