# METHOD OF DESIGN OF CONTROL ALGORITHMS FOR MULTIPHASE INVERTERS

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It is a common knowledge now that the increase of a phase number (i.e. a number of phases) more than four is a very effective way to improve a few technical-and-economic characteristics of AC frequency controlled electric drives. This fact makes the researchers to continue their investigations in this direction and in the field of the control of multiphase AC drives in particular. It is obvious that the increase of a phase number increases the number of the degrees of freedom in the field of the control of an AC drive system. But one cannot say that all the control opportunities of these multiphase drives are already discovered.

It is necessary to work out some new methods of control algorithm design for multiphase AC drives to discover new kinds of these algorithms. One of such new methods is presented in this paper.

According to this method the space trajectories of the resulting vector F of the switching functions of the inverter phases are chosen as the subjects of analysis and design action. This choice is explained by the following fact: the character of the motion (in time) of the vector F is analogous to the character of the AC motor torque.

According to the method presented in this paper the basic data for the algorithm design is the set of the positions of the vector F for the given phase number M of an electric drive system.

The trajectory of the vector F that is close to the ideal trajectory is formed using this set. The type of the ideal trajectory depends on the aim of the algorithm design (minimization of the motor torque oscillations, change in the mechanical characteristics of a motor (if $M > 5$), etc.).

For example, if the aim of the algorithm design is the minimization of the motor torque oscillation amplitudes, the ideal trajectory must have a form of a circle.

The formation of the necessary trajectory begins at the choice of the positions of the vector F that have the space angles corresponding to the chosen ideal trajectory. Then it will be necessary to determine the deviation of the amplitudes of the chosen vectors F from the ideal trajectory.

This deviation shows the value of the time change in the amplitude of the inverter phase voltage. This change may be realized by the change of the input circuit voltage of an inverter or by the use of the corresponding pulse modulation of the inverter phase voltage with constant ratio of pulse period-to-pulse duration.

Using this design method the set of the multiphase inverters control algorithms has been worked out for a great number of the M values [1-6]. All these algorithms may be divided into two large groups:

1) the algorithms for minimization of the torque oscillation amplitudes of the multiphase AC motors (and for increase of these oscillation frequency;

2) the algorithms for change of mechanical characteristics of the multiphase (with $M > 5$) AC motors (for example, for change in the synchronous rotation speed and the maximal torque).

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