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## REVIEW OF METHODS OF ENERGY SAVING AT THE CONSTRUCTION OF ENERGY EFFICIENT SYSTEMS FOR CONTROL OF A TRACTION ELECTRIC DRIVE

А. Н. БАРТАШЕВИЧ

Научный руководитель Г. С. ЛЕНЕВСКИЙ, канд. техн. наук, доц.

Консультант Г. И. СВИДИНСКАЯ

ГУ ВПО «Белорусско-Российский университет»

When designing energy-efficient control systems for the traction electric drive, it is necessary to solve the problems:

– ensuring the optimum operating mode of the internal combustion engine (ICE);

– the most efficient use of energy generated by ICE.

The operation of the ICE is characterized by a regime point, which is determined by the following «coordinates»:

– the angular velocity of the shaft;

– developed torque (or power).

It is possible to single out the main methods of energy saving by means of the electric drive, which allow to use efficiently the energy produced by the ICE.

1. Energy saving involves rational selection of the electric motor's power. With irrational power of the electric motor and lack of proper regulation, it performs electromechanical energy conversion with high specific losses due to low efficiency and  $\cos \varphi$  at a load less than the nominal one.

2. Energy saving consists in increasing the profitability of the electric drive due to the use of an electric motor of a special design, which initially possesses increased energy characteristics. Energy characteristics are determined by the level of losses during electromechanical energy conversion, which depend on the control methods and operating modes of electric motors.

3. Energy saving with the use of special devices, switched between the power supply and the electric motor, which control the start-up and braking modes, while simultaneously performing the energy-saving function. With the help of these devices, it is possible to reduce losses in transient start-up and braking processes.

4. Energy saving involves the use of adjustable electric drives.

5. Energy saving by means of the electric drive taking into account energy criteria of an estimation of quality. The complexity of implementing this method, associated with the need for parallel control as the main coordinates of the electric drive, and electromagnetic processes that determine the mode of operation of the electric motor and its loss.