

**Energy-efficient control of electric drive technological machines**  
**by its energy parameters**  
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**Abstract**

Analysis of operational and energy indicators of technological machines with variable-speed asynchronous electric drive for adjusting parameters of technological processes and insights for their failures in operation give grounds to argue about the need for further research aimed at improving existing and developing new equipment.

The purpose of the study is the development of adaptive control algorithm of frequency-regulated electric drive technology for increased efficiency and operational reliability of their work.

To adjust the speed of rotation of the working bodies of the technological machines with smoothly varying modes of operation (fans, centrifugal pumps, etc) use translators with scalar control, in which there is a possibility to choose the suitable for the needs of the law Regulation ( $u/f$ -dependence). However, in most cases, they are too difficult to implement algorithms, while in other cases these algorithms specify the approximate character of  $u/f$ -dependences, and therefore do not provide fully energy efficient modes of asynchronous electric drive. These statements are valid also for adjustment of fan and pump units, where the nature of the mechanical load of asynchronous motor may vary depending on many factors.

With that said, it follows that the more exact will be played  $u/f$ -dependence by means of frequency converter with an induction motor, the higher will be their energy efficiency.

Efficiency of frequency-regulated electric drive technological machines is achieved by minimizing power losses in induction motor that consists in optimizing the magnetic flux of stator variable voltage value applied to it.

Created a structure of adaptive control system of electric drive technology machines that provides increased its efficiency in a wide speed range.

Application method sans sensors identify process parameters allows to increase reliability and system performance motor control, especially during its operation in

aggressive environments and high control objects because it does not require the use of additional cable lines sensors with hardware controller.

**Key words:** *Technological machine, regulated electric drive, adaptive algorithm, control system, computer unit, sensor.*