

# Dynamic analysis and synthesis of mechanisms with consideration of mechanical characteristics of asynchronous electric motor

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*The correct choice of drive parameters is a prerequisite for high-performance and economical operation of the machine set. Dynamic synthesis of electrically powered machines usually accounts only for mass and size of a flywheel which provides the given non-uniformity of movement, and the parameters characterizing the operation of the motor are not considered. This approach does not allow effective use of electrical energy. The article presents a method of dynamic analysis and synthesis of a machine set with an asynchronous electric motor, which makes it possible to explore not only the non-uniformity of movement, but also the parameters that characterize the operation of the motor: the efficiency and power factor. This technique is based on the l-section motor equivalent circuit. When conducting the dynamic synthesis of electric drive we propose to determine not only the moment of inertia of rotating mass, but also the gear ratio of the transmission mechanism according to the conditions to maximize the engine efficiency and the possibility to start the drive. We used the proposed method in dynamic analysis and synthesis of a plunger pump.*

**Keywords:** *electric drive, equivalent circuit, dynamic analysis, efficiency factor, power factor*

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