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PHYSICAL AND COMPUTER MODELLING OF THE AUTOMATIC CONTROL SYSTEM OF A TWO-MASS SYSTEM POSITIONING ELECTRIC DRIVE

Automatic control systems for electric drives are widely used in industry, as they have high accuracy and the required speed in comparison with semi-automatic and electromechanical control systems.

The need to adjust the position of the executive positioning mechanisms arises in such lifting machines as bridge cranes.

The main requirements for the studied mechanisms are to ensure the required accuracy of the mechanism installation at a given point in the minimum time without over-adjustment. To meet these requirements, proportional–integral–derivative (PID) controllers are widely used in the control systems of the studied drives.

However, the known algorithms for finding the coefficients of PID controller are not universal for any control object, so the search for coefficients is quite common in a practical way. The disadvantages of this method are the risks of damage to real equipment and the long time to adjust the controller. One way to minimize the impact of these shortcomings is to use mathematical modeling of the control object.

The aim of the project is to study the methods of object identification to develop a simplified mathematical model that minimizes the computational load when finding the coefficients by simulation.

Conclusions. The developed mathematical model of the positioning drive of a two-mass system, the adequacy of which is confirmed by physical experiments, can be used for a practical method of setting the PID controller. The controller will provide the required static and dynamic characteristics of the system, reduce setup time and the risk of damage.