SELECTION OF THE PARAMETERS OF THE ELECTROHYDRAULIC FOLLOWING DRIVE BASED ON THE PRINCIPLE OF MINIMIZING ENERGY CONSUMPTION AND ENSURING THE SPECIFIED ACCURACY OF THE POSITIONING OF THE WORKING ELEMENT

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When designing an electro-hydraulic follower drive (EHFD), the task of ensuring the specified positioning accuracy and the specified time of the drive operation in the conditions of positional control is usually set. In this study, the initial function of the goal is the minimum energy consumption under the given conditions of operation of the EHFD.

As a result of the implementation of this principle, the dependence of the optimal force *A* of the drive and the optimal power of the drive *N* on the initial parameters was obtained: $A=(12{,}6m\cdot L)/t_c^2$, $N=(18{,}7m\cdot L^2)/t_c^3$ (m – mass of moving parts, L – full stroke of the piston, t_c – given time of activation of the drive). Based on the values *A*, find the optimal area of the piston F_p^* and the optimal pressure setting of the pressure valve p_v^* ($A=F_p^*\cdot p_v^*$). The next stage of dynamic synthesis is the selection of EHFD parameters, which ensure the specified accuracy of the positioning of the working body $\pm\Delta y$ and the specified operating time t_c. The solution of this problem is based on the logarithmic amplitude-frequency characteristic (LAFC), built on the basis of the transfer function of the open drive. Here, the requirement of a given positioning accuracy can be represented in the form of a forbidden region in the low-frequency part of the LAFC, and the requirement of a given response time – in the form of a forbidden region in the medium-frequency part of the LAFC. Based on the first condition, the quality factor k_q must correspond to the inequality $k_q \ge k_q^{\min}$, where $k_q^{\min}=\Delta I\, k_{EHA}/2F\Delta y$; *F* – is the area of the piston; k_{EHA} – the amplification factor of the electro-hydraulic amplifier (EHA); ΔI – static control current caused by the residual magnetism of the EHA electromagnetic system. Based on the second condition, the quality factor k_q must correspond to the inequality $k_q \le k_q^*$, where $k_q^*=8{,}33/t_c$. The thus constructed desired LAFC of the drive allows to make a decision about the need to introduce correcting links. If $k_q^{\min} \ge k_q^*$, then a correcting link in the form of an electric RC circuit is built into the input of the electronic amplifier. A graph-analytical method for choosing the structure and parameters of the corrective link is proposed.