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## **Synthesis of Two-Mass Electromechanical Systems with the Fractional Order Desired Form**

### **Abstract:**

The article expands the application of the method of generalized characteristic polynomial synthesis specially for two-mass electromechanical systems by applying of the fractional order desired form, which provides a enough wide range of specified dynamic characteristics: in addition to parameter of the desired speed, it is possible to specify the desired overregulation of the coordinates (increasing the  $q$  parameter of the proposed desired fractional order form provides an increase in the overregulation). This new approach made it possible to carry out a structural-parametric synthesis of a two-mass electromechanical system "thyristor converter-DC motor" with a four-loop system of subordinate regulation. The proposed approach made it possible to synthesize current, motor speed, torque and mechanism speed controllers for the entire four-loop system of subordinate regulation based on the proposed desired fractional form. Thus the results of the research demonstrated the full functionality of the proposed synthesis variant-the specified overregulation and rise time were obtained for the synthesized coordinates.