

INTERNATIONAL CONFERENCE  
St Petersburg, RUSSIA  
04 March 2020



«Metrological Support of Innovative Technologies»  
ICMSIT-2020

THE METHOD OF PID CONTROLLERS  
SYNTHESIS FOR SIXTH-ORDER SYSTEMS

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# Problem statement

- Synthesis of controller parameters for high-order objects.
- A linear ACS with a transfer function of a sixth-order object is investigated
- The problem of parameters PID controller synthesis closed-loop control system, ensure the specified quality indicators in the management of the facility for option set values of the poles are roots of the characteristic equation: dominant real pole and complex poles

# Solution methods

- **Algorithm**
- **Step 1 Determine the transfer function of the closed corrected system.**

From the transfer function of the corrected closed system, it can be seen that the coefficients of the PID controller affect the last three terms of the characteristic polynomial of this system. The remaining coefficients of this polynomial do not depend on the parameters of the PID controller.

- **Step 2 Set the number and type of roots of this polynomial (or poles of the corrected system).**

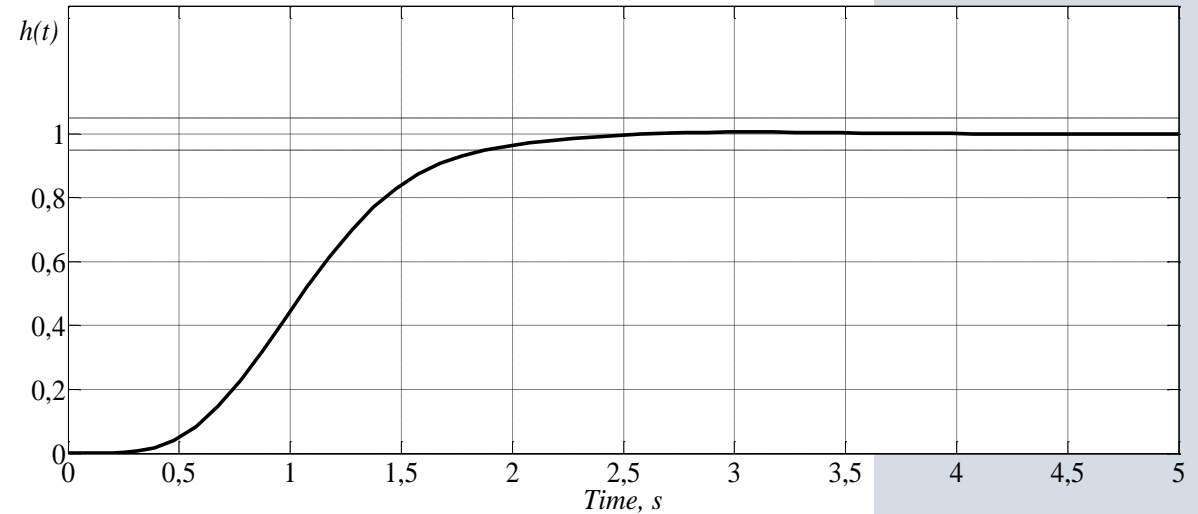
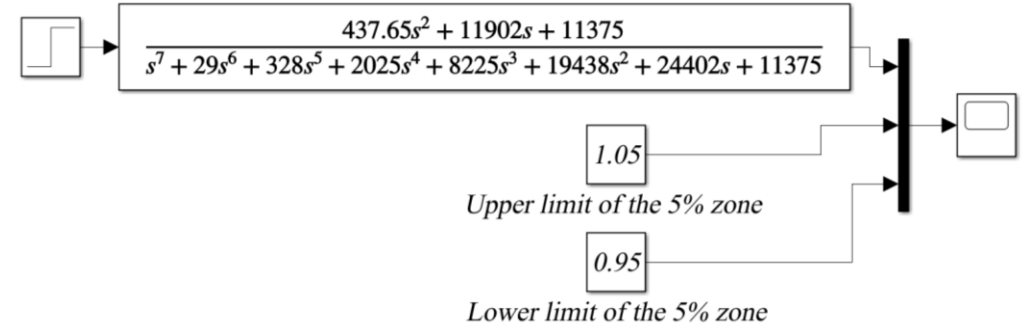


# Solution methods

- **Algorithm**
- **Step 3 Determine the values of the desired polynomial coefficients of the corrected closed system when the values of the characteristic polynomial roots of this system are found.** Construction of the characteristic polynomial corrected closed system expressed in terms of real and complex roots of the characteristic polynomial. Must be fulfilled the requirement of positive parameters of the PID controller.
- **Step 4 Calculate the coefficients of the PID controller model.**
- **Step 5 Check of the PID controller model coefficients by ACS transition characteristic.**

# Conclusions

Results, implementation



Transient characteristic of a control system with a sixth-order object

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