

Final exam questions of Automations

Automations

- Sketch the main structure of a process control! Classify the control strategies! What are the points of view to choose control strategies?
- How you can choose the sample time if you know the time constants of the process field transfer function?
- Describe the structure of the user program of PLC.

- What is the dimensionless technique? What are the standard values of the signals in a control system?
- The structure of the cascade and feed-forward control?
- Highlight the role of the transmitter and the actuator in a control system! Describe the operating principle of an actuator of your choice!

- Classifies the steady-state characteristic of the transfer blocks!
- Draw the unit step response of proportional, first order, dead time (HPT1) and integral first order (IT1) systems! Give the transfer functions of these!
- Describe the operating principle of a level and temperature transmitter of your choice!

- How you can examine the stability of the closed-loop system using the open-loop transfer function? Explain the following terms: phase margin, gain margin!
- Describe the small-signal linearization method. What condition is needed to use this method?
- How you can choose the steady-state characteristics of the controller?

- How you can examine the stability of the closed-loop system using the closed-loop transfer function? Explain the following terms: zeros, poles, root-loci diagram!
- Elements of the block diagram. Define the transfer function generation from cascade, parallel, and feedback simpler blocks.
- How you can choose the sample time if you can't determine a limit frequency of the process field transfer function?

- Sketch the detailed block diagram of a feedback control system and define the blocks, signals and variables!
- Define the closed loop transfer functions and the opened loop transfer function of a feedback control system! Highlight what this term "system type" means?

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- What is the classical three-term controller? Outline the control actions associated with each of its constituent parts.
- Draw the oscillatory step response of the closed loop system and explain the quality parameters in time domain!
- What determines the steady-state remaining error at setpoint tracking?
- What is the goal of the compensation? What is the difference between the PIDT1 and PIPDT1 controller?

- Which transfer functions are used approaching of the real reaction curve? Which is the offered type of classical three-term controller?
- What determines the steady-state remaining error at disturbance suppression?
- What are the main characteristics of the PLC? What is the hardware structure of the PLC?

- Give the transfer function of The PI controller and draw its Bode diagram! Indicate the frequency which will fit to the future gain-crossover frequency on the Bode plot!
- Draw the unit step response of a proportional (P), and a second order (PT2) systems! Give the transfer functions and the Bode plot of these!
- What is the goal of the compensation? What is the difference between the PIDT1 and PIPDT1 controller?

- Give the transfer function of The PDT1 controller and draw its Bode diagram! Indicate the frequency which will fit to the future gain-crossover frequency on the Bode plot!
- What is the difference between the grey and black model
- Draw the unit step response of an integral (I), and a first order (PT1) systems! Give the transfer functions and the Bode plot of these!