

# Quizzes of TTK4225 - Systems Theory, Autumn 2020

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## Question 85

To compute the transfer function of a LTI system one has necessarily to pass through Laplace-transforming its impulse response

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 86

Compute the transfer function of the system  $\ddot{x} = a_1\dot{x} + a_0x + u$

## Question 87

Compute the gain of the system  $\ddot{x} = a_1\dot{x} + a_0x + u$

## Question 88

Compute  $\lim_{t \rightarrow +\infty} x(t)$  where  $x(t)$  is the trajectory of the system  $\ddot{x} = a_1 \dot{x} + a_0 x + u$  corresponding to null initial conditions and  $u(t > 0) = t$ , 0 otherwise

## Question 89

The number of different types of modes in a system is ...

- ① equal to the number of zeros of the transfer function
- ② at most equal to the number of zeros of the transfer function
- ③ equal to the number of poles of the transfer function
- ④ at most equal to the number of poles of the transfer function
- ⑤ I do not know

## Question 90

Every LTI system has a rational transfer function

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 91

The zeros of a transfer function affect the stability properties of that system

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know



## Question 92

The zeros of a transfer function affect the transient of the step response of that system

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 93

The number of zeros of a rational transfer function modelling a physical system cannot be bigger than the number of poles

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 94

The number of zeros of a rational transfer function cannot be bigger than the number of poles

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 95

When designing a LTI controller, it may be meaningful to design the zeros of a transfer function so to improve the overall response of the closed-loop system

- ① true
- ② false
- ③ it depends on the system
- ④ I do not know

## Question 96

The convolution of a rectangular signal with itself leads to ...

- ① another rectangle
- ② a triangle
- ③ a trapezoid
- ④ it depends on the length of the rectangle
- ⑤ I do not know

## Question 97

Convolution is a nonlinear operator

- ① true
- ② false
- ③ it depends on the actual signals that are convolved
- ④ I do not know