Quizzes of TTK4225 - Systems Theory, Autumn 2020

Damiano Varagnolo

Question 57

$\mathcal{L}\{\ddot{x}\} = ?$

1. $s^2X(s) + sx(0) + \dot{x}(0)$
2. $s^2X(s) - sx(0) - \dot{x}(0)$
3. $s^2X(s) + s\dot{x}(0) + x(0)$
4. $s^2X(s) - s\dot{x}(0) - x(0)$
5. I do not know

Question 58

$\mathcal{L}\{H(t)\} = ?$

1. s
2. $-s$
3. $1/s$
4. $-1/s$
5. I do not know

Question 59

$\mathcal{L}\left\{e^{at}\sin\omega t\right\}$ =?

1. $\dfrac{\omega}{(s-a)^2+\omega^2}$
2. $\dfrac{\omega}{(s-a)^2-\omega^2}$
3. $\dfrac{s-a}{(s-a)^2+\omega^2}$
4. $\dfrac{s-a}{(s-a)^2-\omega^2}$
5. I do not know

Question 60

$\mathcal{L}\left\{e^{at}\cos\omega t\right\} = ?$

1. $\dfrac{\omega}{(s-a)^2+\omega^2}$
2. $\dfrac{\omega}{(s-a)^2-\omega^2}$
3. $\dfrac{s-a}{(s-a)^2+\omega^2}$
4. $\dfrac{s-a}{(s-a)^2-\omega^2}$
5. I do not know

Question 61

which option is correct?

1. $e^{at}f(t)$ implies $F(s-a)$, and $f(t-a)\mu(t-a)$ implies $e^{-as}F(s)$
2. $e^{at}f(t)$ implies $F(s+a)$, and $f(t-a)\mu(t-a)$ implies $e^{+as}F(s)$
3. $e^{at}f(t)$ implies $F(s-a)$, and $f(t+a)\mu(t+a)$ implies $e^{-as}F(s)$
4. $e^{at}f(t)$ implies $F(s+a)$, and $f(t+a)\mu(t+a)$ implies $e^{+as}F(s)$
5. I do not know

Question 62

which option is correct?

1. $\mathcal{L}\left\{t^n e^{at}\right\} = \dfrac{n!}{(s-a)^n}$
2. $\mathcal{L}\left\{t^n e^{at}\right\} = \dfrac{n!}{(s-a)^{n+1}}$
3. $\mathcal{L}\left\{t^{n+1} e^{at}\right\} = \dfrac{n!}{(s-a)^n}$
4. $\mathcal{L}\left\{t^{n+1} e^{at}\right\} = \dfrac{n!}{(s-a)^{n+1}}$
5. I do not know

Question 63

when do we have underdamping, in terms of the poles of a second order system?

1. when the poles are both real but distinct
2. when there is a double real pole
3. when the poles are complex conjugates
4. I do not know

Question 64

when do we have critical damping, in terms of the poles of a second order system?

1. when the poles are both real but distinct
2. when there is a double real pole
3. when the poles are complex conjugates
4. I do not know

Question 65

when do we have overdamping, in terms of the poles of a second order system?

1. when the poles are both real but distinct
2. when there is a double real pole
3. when the poles are complex conjugates
4. I do not know

Question 66

how do the initial conditions of the system influence the modes of the system in free evolution?

1. they influence their time constants
2. they influence their initial value
3. they influence their amplitude
4. I do not know

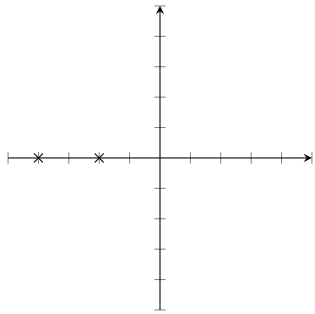
Question 67

which measurement unit is associated to s in a Laplace transform?

1. seconds
2. seconds^{-1}
3. hours
4. hours^{-1}
5. none of the above
6. I do not know

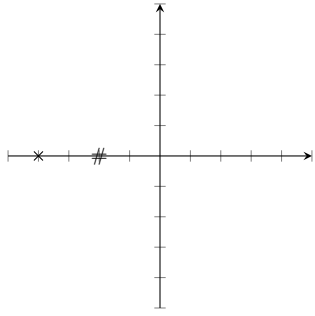
Question 68

which kind of impulse response may correspond to this poles configuration?



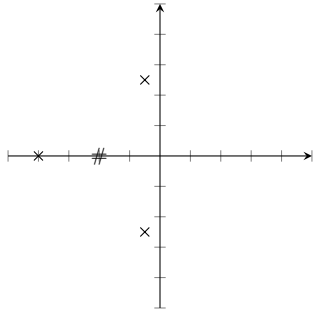
Question 69

which kind of impulse response may correspond to this poles configuration?



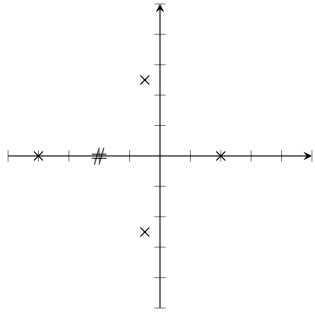
Question 70

which kind of impulse response may correspond to this poles configuration?



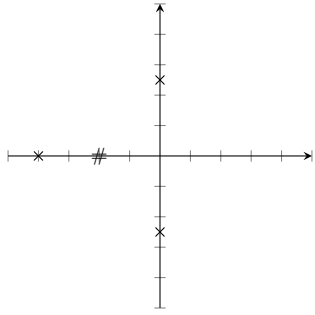
Question 71

which kind of impulse response may correspond to this poles configuration?



Question 72

which kind of impulse response may correspond to this poles configuration?



Question 73

which kind of impulse response may correspond to this poles configuration?