Course
MEC-E5001
Course materials
Your points
Lab Queue

This course has already ended.

« 2.1 Materials Course materials 2.3 Exercises round 2 »
MEC-E5001 / 2. Dynamic systems / 2.2 Lecture Quiz 2

Lecture Quiz 2

Points 0 / 110 My submissions 0 / 10
Deadline Tuesday, 23 January 2024, 09:00
To be submitted alone

The deadline for the assignment has passed (Tuesday, 30 January 2024, 09:00).

Laplace transform the following equation of motion $m\ddot{x}(t) + c\dot{x}(t) + kx(t) = f(t)$ to get the transfer function.

Input the function in Matlab notation using the variable names m, c, k, and s (= complex frequency parameter). For example, (m * s + c * s ^ 2 + k * s ^ 3) / 5

X(s)/F(s) =

Submit

Points 0 / 240 My submissions 0 / 2
Deadline Tuesday, 23 January 2024, 09:00
To be submitted alone
Show model answer

The deadline for the assignment has passed (Tuesday, 30 January 2024, 09:00).

Question 1 60 points

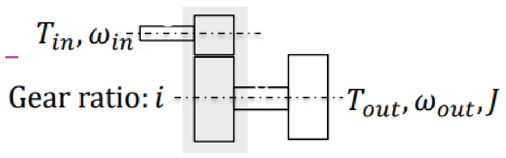
What is the behavior of the transfer function $X(s)/F(s)$, when the frequency is zero? ($\omega = 0$)

- ○ $\frac{1}{k}$
- ○ $\frac{1}{cs+k}$
- ○ $\frac{1}{ms^2+cs+k}$
- ○ 1
- ○ 0
- ○ 42

Question 2 60 points

What is the behavior of the transfer function $X(s)/F(s)$, when the frequency is closing to infinity? ($\omega \to \infty$)

- ☐ 1
- ☐ 0
- ☐ k
- ☐ $\frac{1}{ms^2+cs+k}$
- ☐ $\frac{1}{k}$
- ☐ 42



Question 3 60 points

How is the moment of inertia J is "seen" over a reduction gear (gear ratio i) at the input side? In other words, what is the relationship between inertia in and inertia out in terms of gear ratio? Use the variables given in the picture to calculate.

- ☐ $\frac{1}{i^2}$
- ☐ i^2
- ☐ i
- ☐ $2i$
- ☐ $\frac{i}{2}$

Question 4 60 points

A tire weights 10 kg, and it's radius is 30 cm. How much inertia is transferred over a reduction gear that has a gear ratio of 3? You can think of a tire as a solid cylinder or a homogeneous disk. The unit is kg*m², which you do not need to include in your answer, just the numerical value.

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