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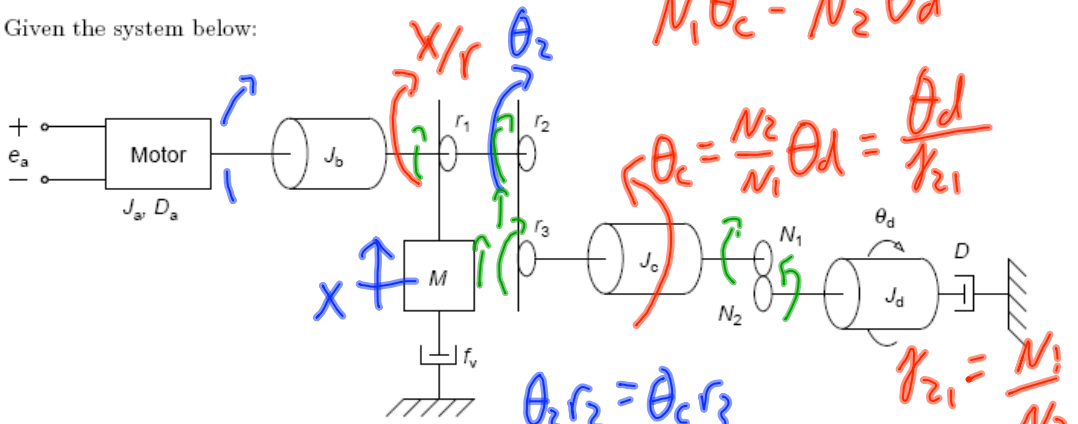
Problem IV: [20 pts.] Motorized Systems

Given the system below:



(a) Draw the equivalent system as seen by the motor, and

(b) Determine the value of the transfer function $G(s) = \Theta_d(s)/E_a(s)$. Assume that K_t, K_b, and R_a are known.

Done

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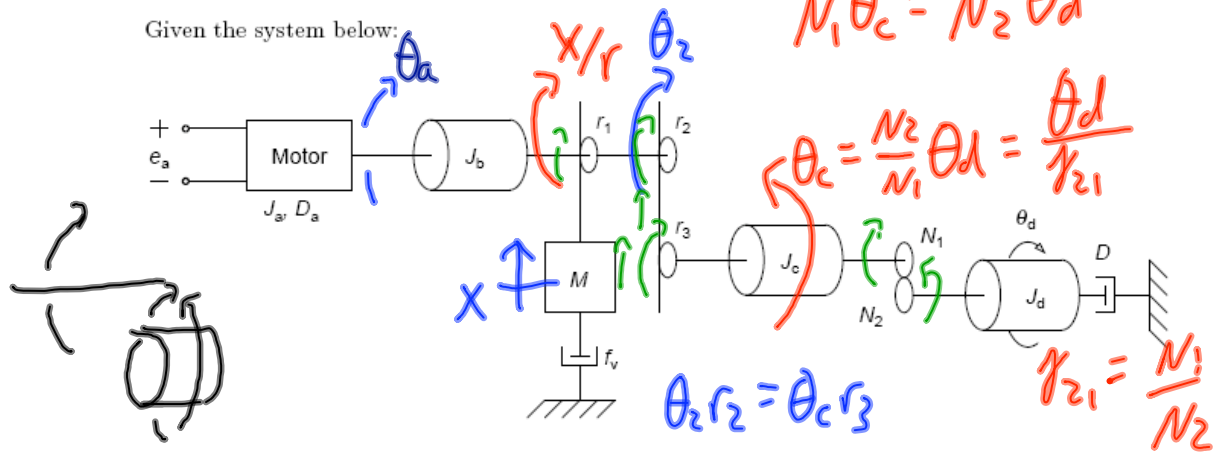
Problem IV: [20 pts.] Motorized Systems

Given the system below:



(a) Draw the equivalent system as seen by the motor, and

(b) Determine the value of the transfer function $G(s) = \Theta_d(s)/E_a(s)$. Assume that K_t, K_b, and R_a are known.

Done

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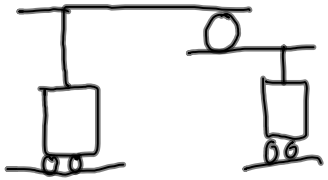
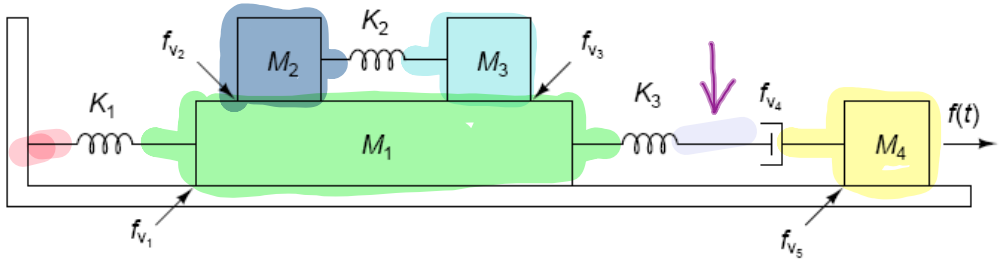


Name (please print):
Community Standard (print ACPUB ID):

Problem II: [20 pts.] Translational Systems

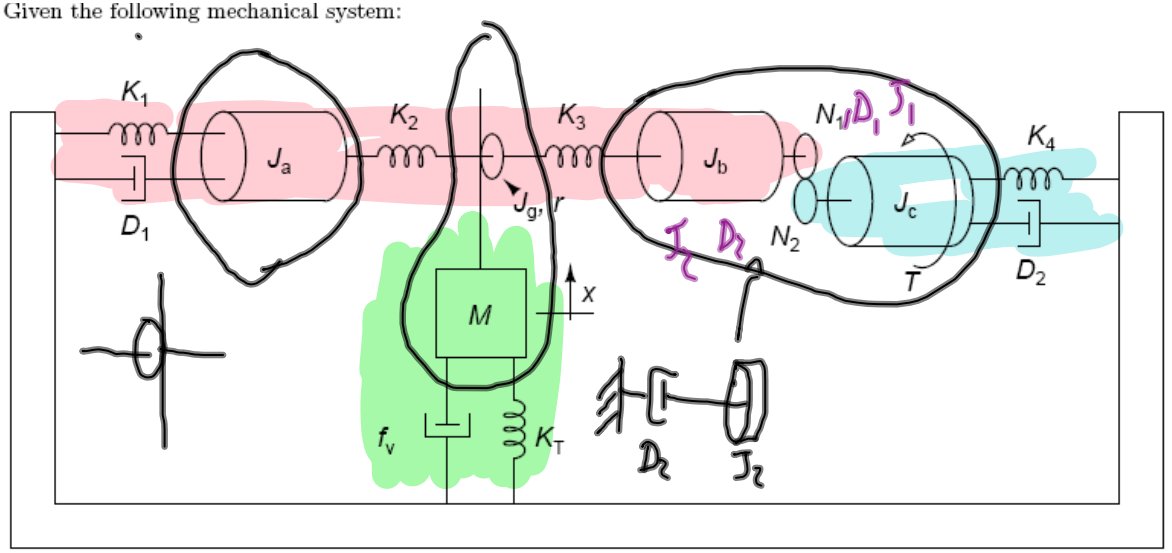
Given the system below,



set up, but do not solve, a system of equations that could be used to find a transfer function

Done

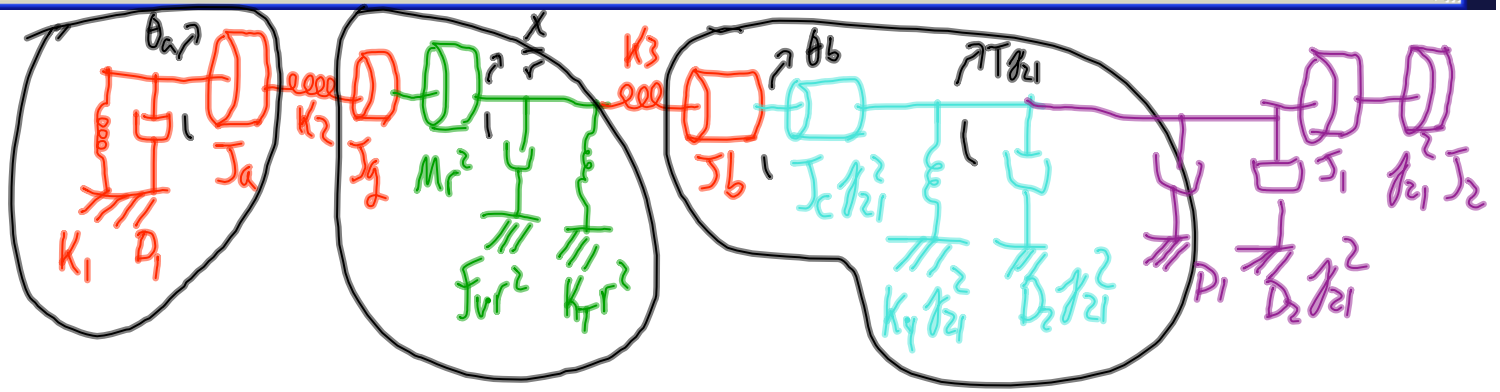
Given the following mechanical system:



(a) Clearly draw the system from the perspective of the pinion gear J_g, using symbols.

(b) Clearly set up a system of equations that could be used to solve for the Laplace transform of any of the angular positions of the shafts or of the position of the translational masses as a function of the Laplace transform of the input torque $\mathcal{L}\{T(t)\} = \mathcal{T}(s)$ and the symbolic representation of the physical parameters

one



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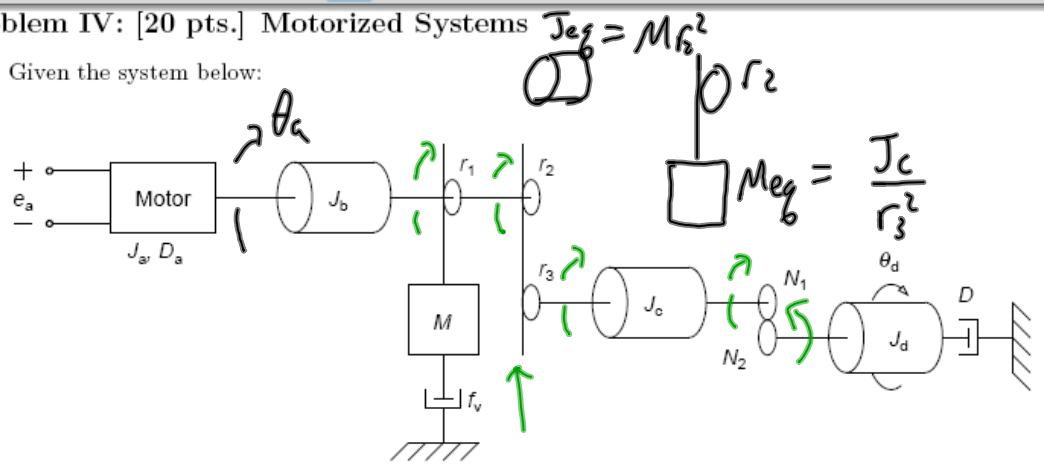
Problem IV: [20 pts.] Motorized Systems

Given the system below:



(a) Draw the equivalent system as seen by the motor, and

(b) Determine the value of the transfer function $G(s) = \Theta_d(s)/E_a(s)$. Assume that K_t, K_b, and R_a are known.

$$J_{eq} = J_a + J_b + r_1^2 M + r_2^2\left(\frac{1}{r_3^2}\left(J_c + \gamma_{21}^2 J_d\right)\right)$$

$$D_{eq} = D_a + r_1^2 f_v + r_2^2\left(\frac{1}{r_3^2}\left(\gamma_{21}^2 D\right)\right)$$

Done