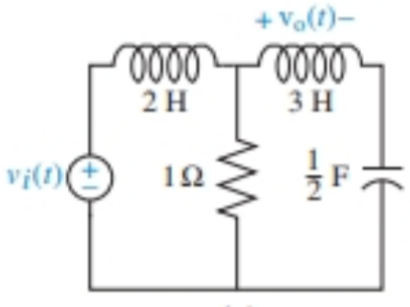
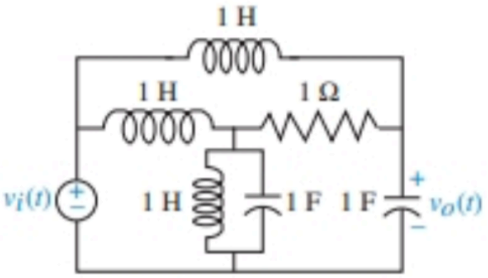
BME 444
HW 1 - Due Feb 3, 2022 before class

Derive equations by hand on paper (or on a tablet). Solve for transfer functions using Matlab. Upload pictures of your equations and your Matlab file to Blackboard for credit.

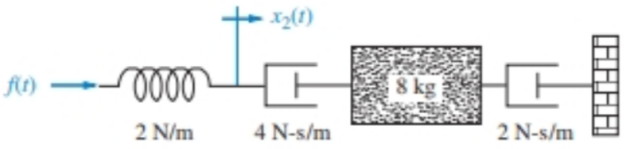
1. Find $G(s) = V_o(s)/V_i(s)$ for the circuit shown below using mesh analysis.



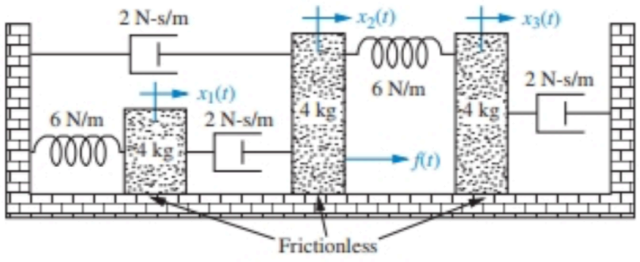
2. Find $G(s) = V_o(s)/V_i(s)$ for the circuit shown below using nodal analysis.



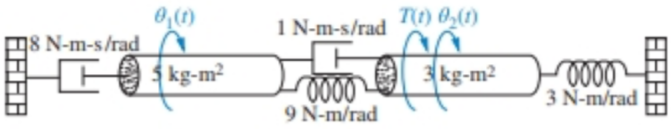
3. Find $G(s) = X_2(s)/F(s)$ for the translational system shown below.



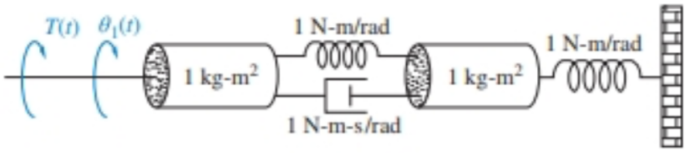
4. Find $G(s) = X_3(s)/F(s)$ for the translational system shown below.



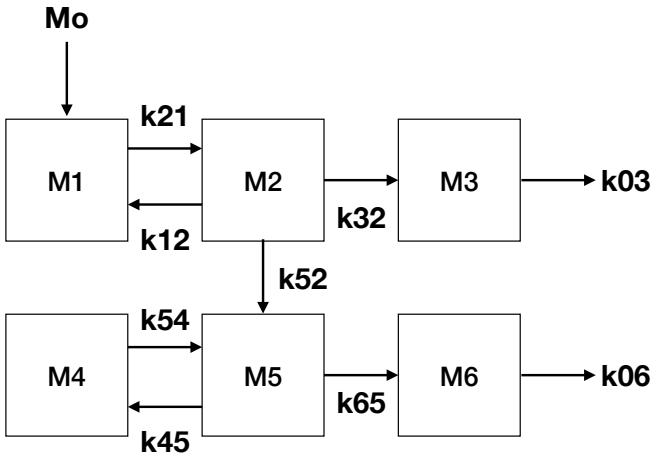
5. Find $G(s) = \theta_1(s)/T(s)$ for the rotational system shown below.



6. Find $G(s) = \theta_1(s)/T(s)$ for the rotational system shown below.



7. The dye bromosulfophthalein (BSP) is used to assess liver function. Find $G(s) = M_4(s)/M_o(s)$ for the compartment model of liver shown below. Assume all $k = 1$ s^{-1}.



8. Find $G(s) = H_2(s)/Q(s)$ for the hydraulic system shown below. Assume all R and C values equal 1.