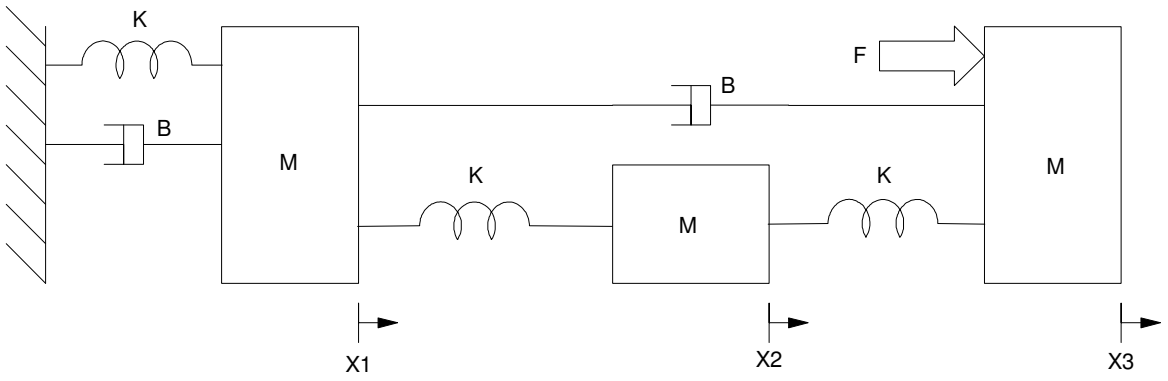
ECE 461/661 Handout #15

Mass Spring Systems

Draw the circuit equivalent for the following mass-spring system. Assume

- M = 1kg, B = 0.2 Ns/m, K = 10N/m

Write the equations of motion (i.e. write the voltage node equations)

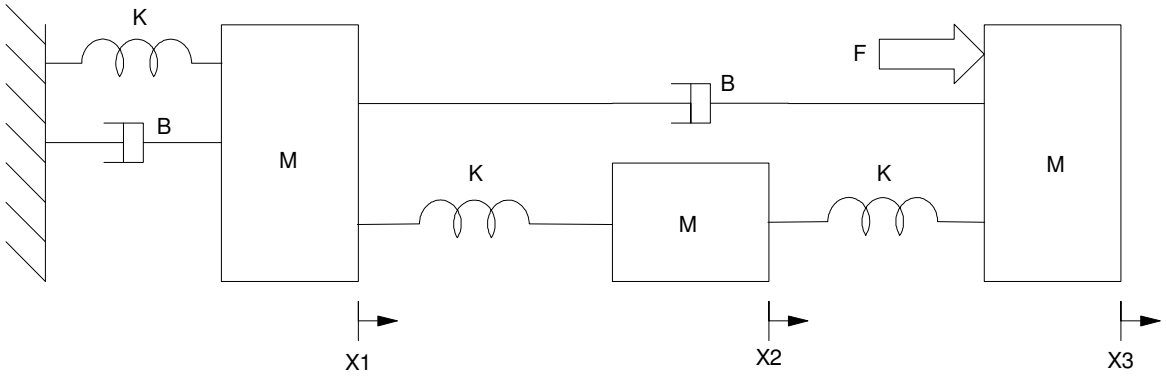


Mass Spring Systems - Solution

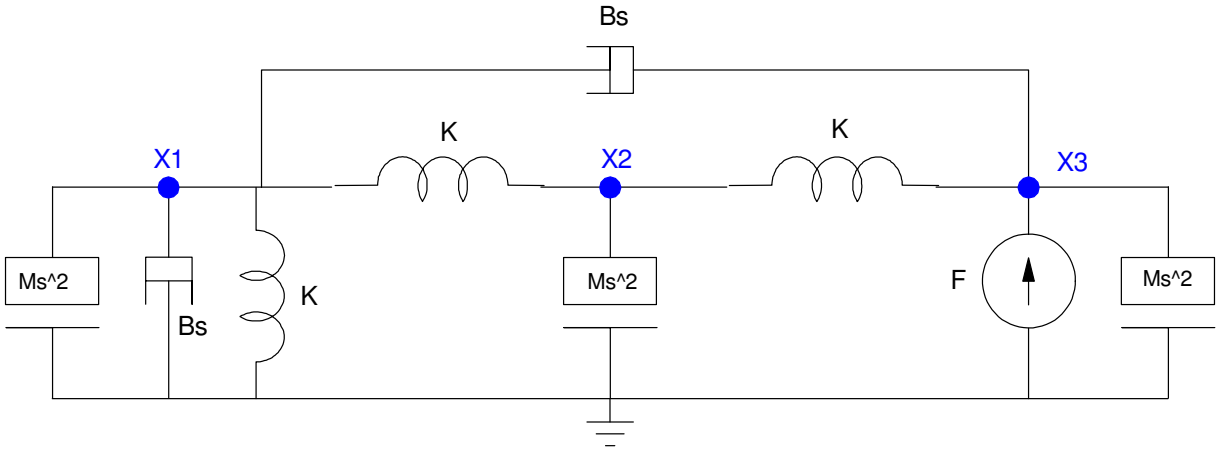
ECE 461/661 - State-Space #15

Draw the circuit equivalent for the following mass-spring system. Assume

- M = 1kg, B = 0.2 Ns/m, K = 10N/m
- Write the equations of motion (i.e. write the voltage node equations)



First, draw the circuit equivalent



Now write the votlage node equations. Note that each element is an admittance

$$(Ms^2 + 2Bs + 2K)X_1 - (K)X_2 - (Bs)X_3 = 0$$

$$(Ms^2 + 2K)X_2 - (K)X_1 - (K)X_3 = 0$$

$$(Ms^2 + Bs + K)X_3 - (Bs)X_1 - (K)X_2 = F$$