ECE 461/661 Handout #16
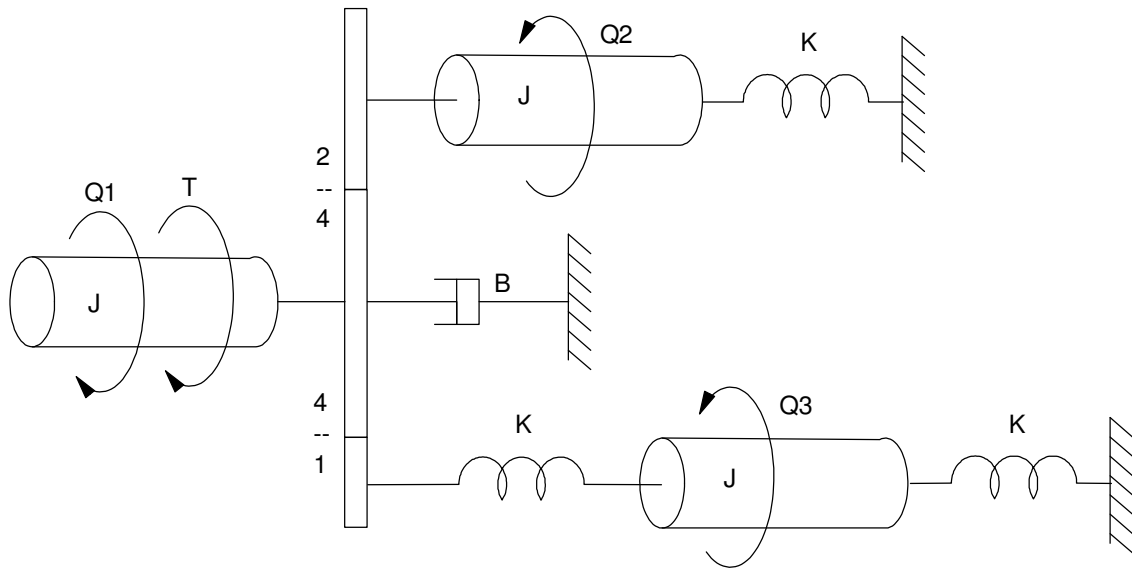
Rotational Systems with Gears

Draw the circuit equivalent for the following mass-spring system.   Assume
   - J = 1kg, B = 0.2 Nms/rad, K = 10N/rad

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

Rotational Systems with Gears - Solution

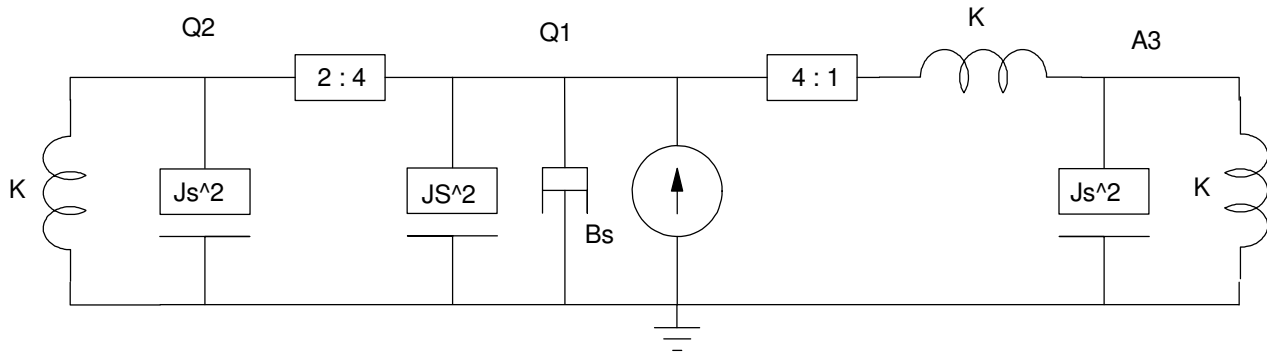Draw the circuit equivalent for the following mass-spring system.   Assume
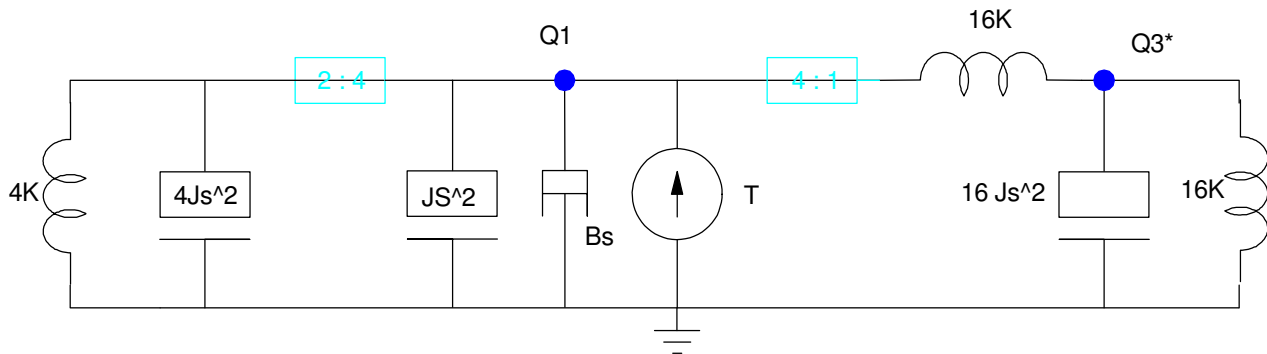
- J = 1kg, B = 0.2 Nms/rad, K = 10N/rad

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

First, draw the circuit equivalent with the gears included

next, remove the gears. Take everything to node Q1

Write the node equations (only two nodes)

$$(5Js^2 + Bs + 20K)\theta_1 - (16K)\theta_3^* = T$$

$$(16Js^2 + 32K)\theta_3^* - (16K)\theta_1 = 0$$