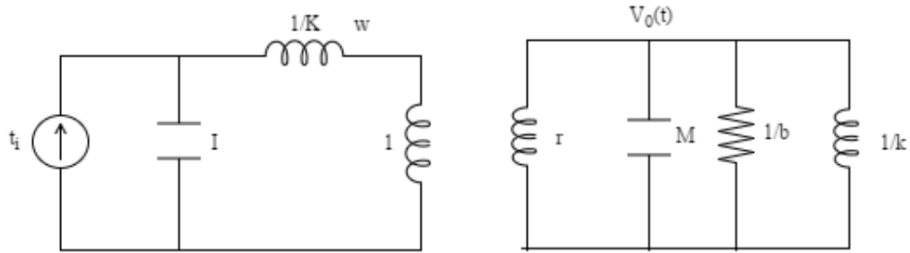


Gabarito – Lista 3 – Modelagem de Sistemas Dinâmicos

Questão 1

(a)

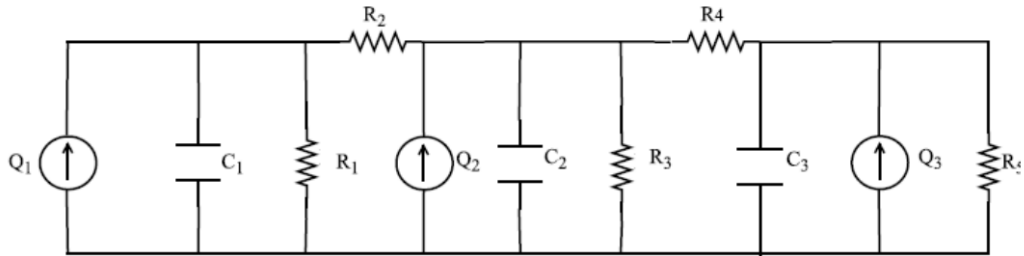


(b)

$$\frac{V_0(s)}{T_i(s)} = r \frac{sK}{Is^2(Ms^2r^2 + bsr^2 + K r^2) + Is^2K + K(Ms^2r^2 + bsr^2 + K r^2)}$$

Questão 2

(a)



(b)

$$\frac{P_3(s)}{Q_1(s)} = \frac{Z_1 Z_2 Z_3}{(Z_1 + R_2 + Z_4)(Z_2 + R_4 + Z_3)}$$

(c)

$$\frac{H_2(s)}{Q_2(s)} = \frac{R_3}{sA_2R_3 + \rho g}$$

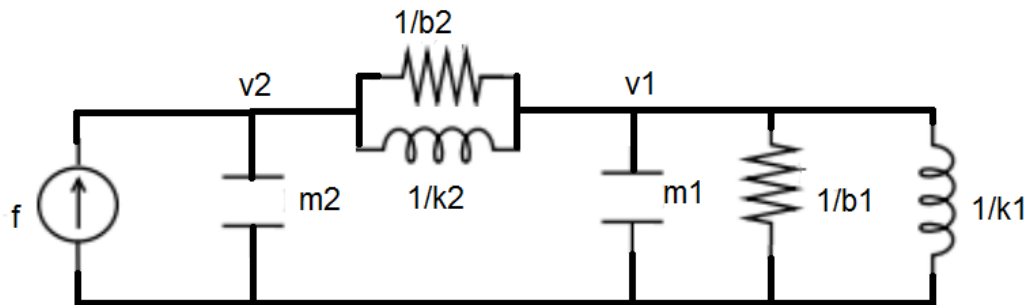
(d)

$$\frac{H_1(s)}{Q_1(s)} = \frac{\frac{R_1}{\rho g}}{sC_1R_1 + 1}$$

(e)

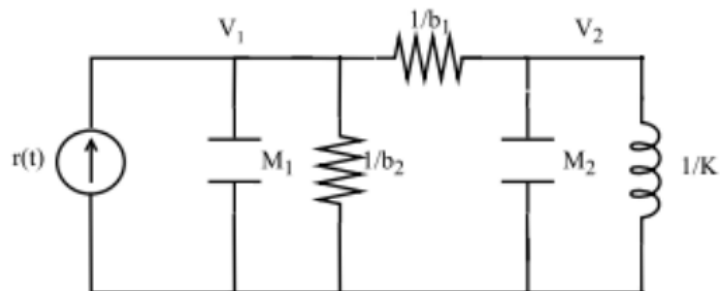
$$\frac{H_3(s)}{Q_3(s)} = \frac{1}{A_3 s}$$

Questão 3



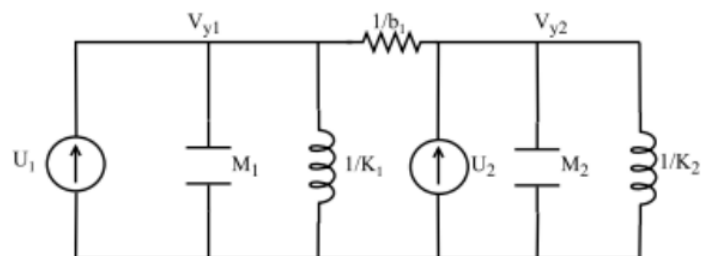
Questão 4

(a)



Questão 5

(a)

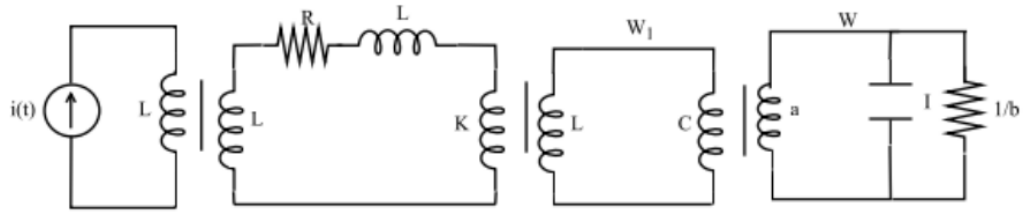


(b)

$$\frac{Y_2 s}{U_2(s)} = \frac{b_1 s + s^2 M_1 + k_1}{s b_1 (s^2 M_1 + k_1) + s b_1 (s^2 M_2 + k_2) + (s^2 M_2 + K_2)(s^2 M_1 + k_1)}$$

### Questão 6

(a)



(b)

$$\frac{\Omega(s)}{I(s)} = \frac{\frac{1}{2}k\frac{c}{a}}{Is + b}$$

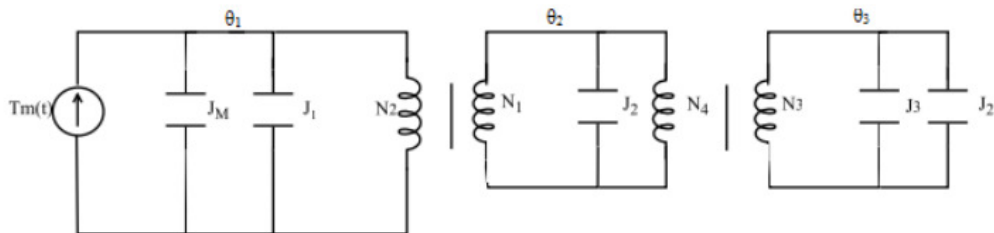
### Questão 7

(a)

$$\frac{\theta_1(s)}{T(s)} = \frac{1}{s[J_{eq}s + B_{eq}]}$$

### Questão 8

(a)

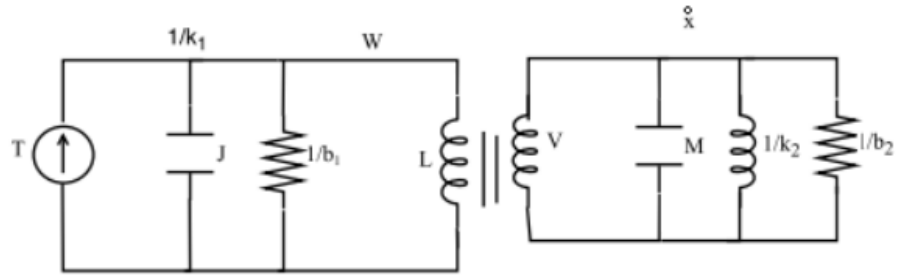


(b)

$$\frac{\theta_3(s)}{T_m(s)} = \frac{1}{\left(\frac{N_2 N_4}{N_1 N_3}\right) s^2 \left[ J_m + J_1 + J_2 \left(\frac{N_1}{N_2}\right)^2 + (J_3 + J_L) \left(\frac{N_3 N_1}{N_4 N_2}\right)^2 \right]}$$

### Questão 9

(a)

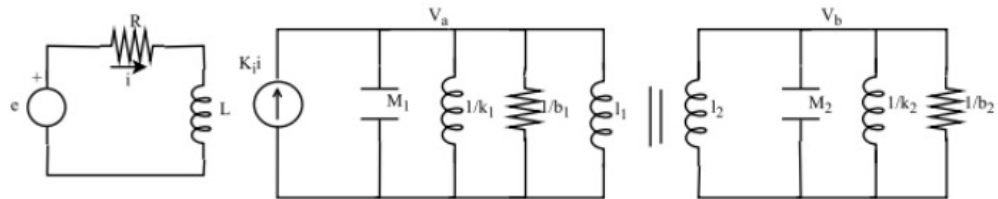


(b)

$$\frac{X(s)}{T(s)} = \frac{r}{J_{eq}s^2 + B_{eq}s + K_{eq}}$$

### Questão 10

(a)



(b)

(c) 
$$\frac{X_a(s)}{E(s)} = \frac{K_i}{(R+sL)(M_{eq}s^2 + b_{eq}s + K_{eq})}$$