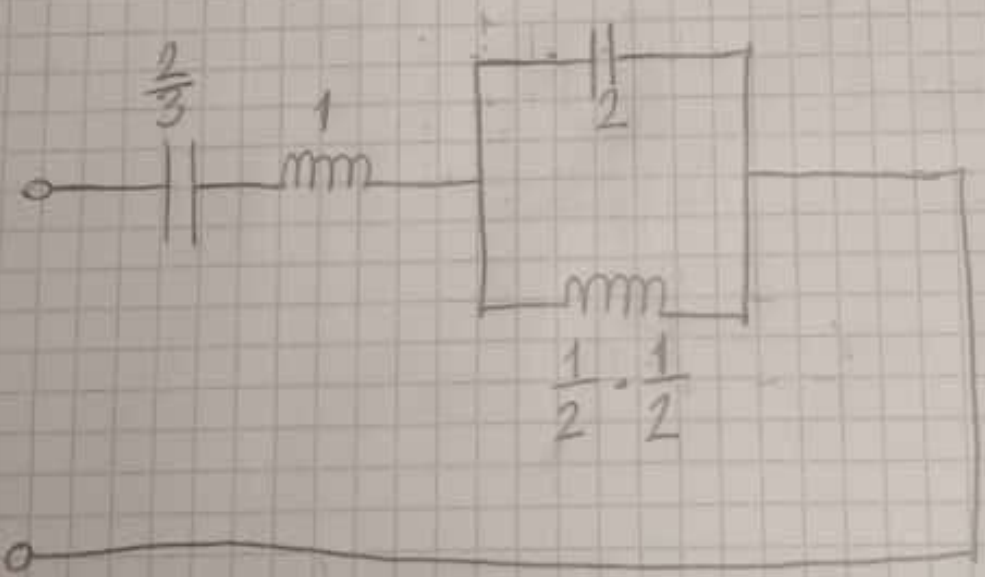
1) $$F(s) = \frac{s^4 + 4s^2 + 3}{s(s^2 + 2)}$$

a) $$K_0 = \lim_{s \to 0} sF(s) = \frac{3}{2}$$

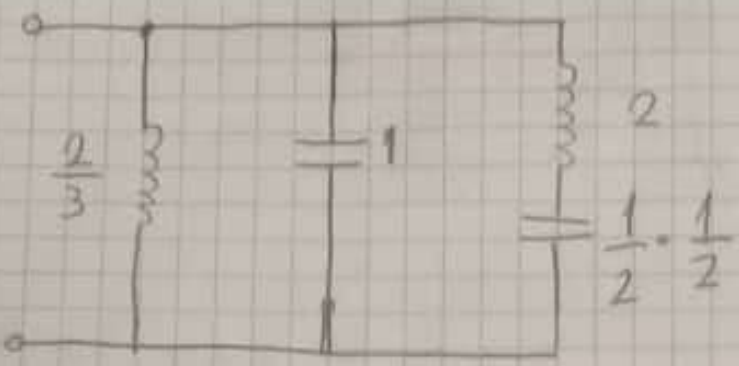
$$K_\infty = \lim_{s \to \infty} \frac{F(s)}{s} = 1$$

$$2K_1 = \lim_{s^2 \to -\omega_1^2} F(s) \cdot \frac{(s^2 + \omega_1^2)}{s} \qquad \omega_1^2 = 2$$

$$2K_1 = \lim_{s^2 \to -2} \frac{s^4 + 4s^2 + 3}{s^2} = \frac{1}{2}$$



b)



c) $F(s) = \dfrac{s^4 + 4s^2 + 3}{s^3 + 2s}$

$s^4 + 4s^2 + 3 \;\big|\; s^3 + 2s$

$s^4 + 2s^2 + 0 \;\big|\; s$

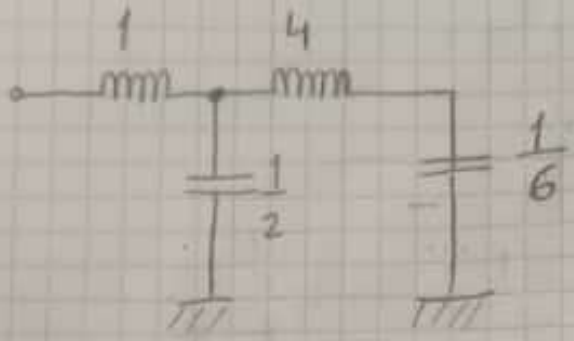
$2s^2 + 3 \;\big|\; \frac{1}{2}s$

$2s^2 \;\big|\; 4s$

$\frac{1}{2}s \;\big|\; 3$

$0 \;\big|\; \frac{1}{6}s$

Cauer I: $\frac{1}{1}$, $\frac{1}{2}$, $\frac{1}{1}$, 4, $\frac{1}{6}$



d)

$3 + 4s^2 + s^4 \;|\; 2s + s^3$

$\frac{3}{2} + \frac{3}{2}s^2 \qquad \frac{3}{2}\;\frac{1}{s}$

$2s + s^3 \;|\; \frac{5}{2}s^2 + s^4$

$2s + \frac{4}{5}s^3 \qquad \frac{4}{5}\;\frac{1}{s}$

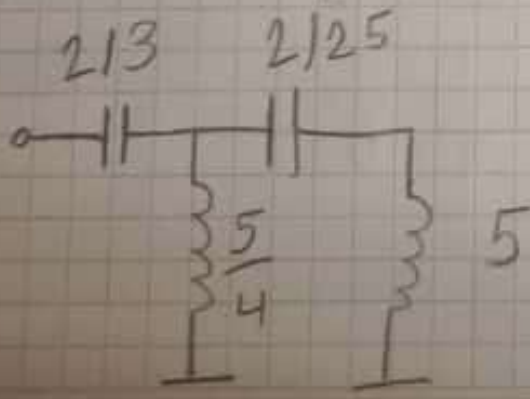
$\frac{5}{2}s^2 + s^4 \;|\; \frac{1}{5}s^3$

$\frac{2}{5}s^2 \qquad \frac{25}{2}\;\frac{1}{s}$

$\frac{1}{5}s^3 \;|\; s^4$

$\frac{1}{5}s^3 \qquad \frac{1}{5}\;\frac{1}{s}$

0



2)

$$Y(s) = \frac{s^5 + 18s^3 + 48s}{6s^4 + 42s^2 + 48}$$

$$Z(s) = \frac{6s^4 + 42s^2 + 48}{s^5 + 18s^3 + 48s}$$

Remoción de ∅

$$48 + 42s^2 + 6s^4 \;\big|\; 48s + 18s^3 + s^5$$

$$48 + 18s^2 + s^4 \quad \frac{1}{s} \qquad C_1 = 1$$

$$48 + 18s^3 + s^5 \;\big|\; 24s^2 + 5s^4$$

$$\frac{48 + 10s^3}{8s^3 + s^5} \quad \frac{2}{s}$$

$$\frac{1}{2} = L_1$$

$$F(s) = \frac{1}{s} + \frac{24s^2 + 5s^4}{48s + 18s^3 + s^5} = \frac{1}{s} + \frac{1}{\frac{48s + 18s^3 + s^5}{24s^2 + 5s^4}}$$

$$F(s) = \frac{1}{s} + \frac{1}{\frac{2}{s} + \frac{8s^3 + s^5}{24s^2 + 5s^4}} = \frac{1}{s} + \frac{1}{\frac{2}{s} + \frac{1}{\frac{24s^2 + 5s^4}{8s^3 + s^5}}}$$

F3

$$F_3(s) = Z_3(s) = \frac{5s^4 + 24s^2}{s^5 + 8s^3} = \frac{s^2(5s^2+24)}{s^3(s^2+8)}$$

$$F_3(s) = \frac{5s^2+24}{s(s^2+8)}$$

$$K_0 = \lim_{s\to 0} s \cdot F_3 = \frac{24}{8}$$

$$K_\infty = \lim_{s\to\infty} \frac{F_3(s)}{s} = 0$$

$$2K_1 = \lim_{s^2\to -8} F_3(s)\frac{(s^2+8)}{s} = \frac{5s^2+24}{s^2} = 1$$