TP6

1) Foster paralelo

$$Y(s) = \frac{(s^2+1)(s^2+5)(s^2+20)}{s(s^2+10)(s^2+2)}$$

$$Y(s) = \frac{K_0}{s} + \frac{2K_1 s}{s^2+10} + \frac{2K_2 \cdot s}{s^2+2} + K_\infty \cdot s$$

$$\lim_{s\to 0} Y(s) = \lim_{s\to 0} \frac{K_0}{3} \rightarrow K_0 = \lim_{s\to 0} s \cdot Y(s) = \lim_{s\to 0} \cancel{s} \cdot \frac{(s^2+1)(s^2+5)(s^2+20)}{\cancel{s}\cdot(s^2+10)(s^2+2)}$$

$$K_0 = \frac{1 \cdot 5 \cdot 20}{10 \cdot 2} = \underline{5}$$

$$\lim_{s^2\to -10} Y(s) = \lim_{s^2\to -10} \frac{2K_1 \cdot s}{s^2+10}$$

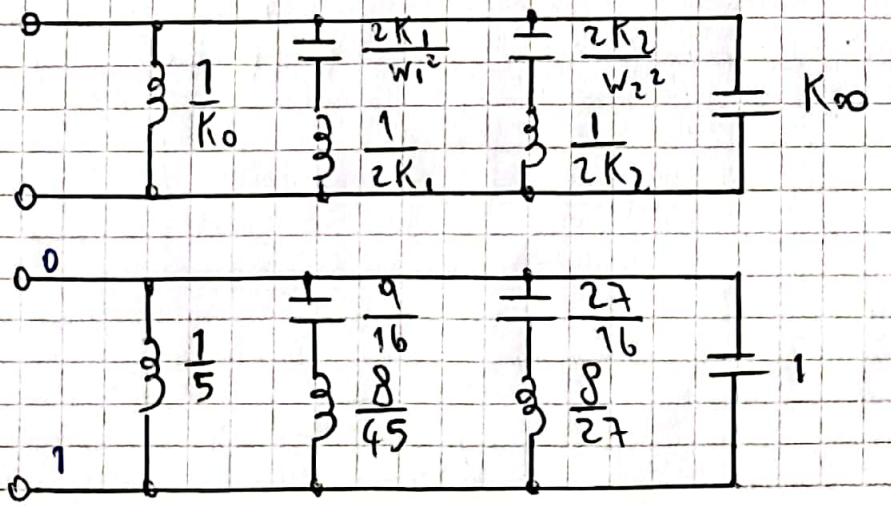
$$2K_1 = \lim_{s^2\to -10} \frac{s^2+10}{s} \cdot Y(s) = \lim_{s^2\to -10} \frac{\cancel{s^2+10}}{s} \cdot \frac{(s^2+1)(s^2+5)(s^2+20)}{s(\cancel{s^2+10})(s^2+2)}$$

$$2K_1 = \frac{(-9)(-5)(10)}{(-10)(-8)} = \frac{45}{8}$$

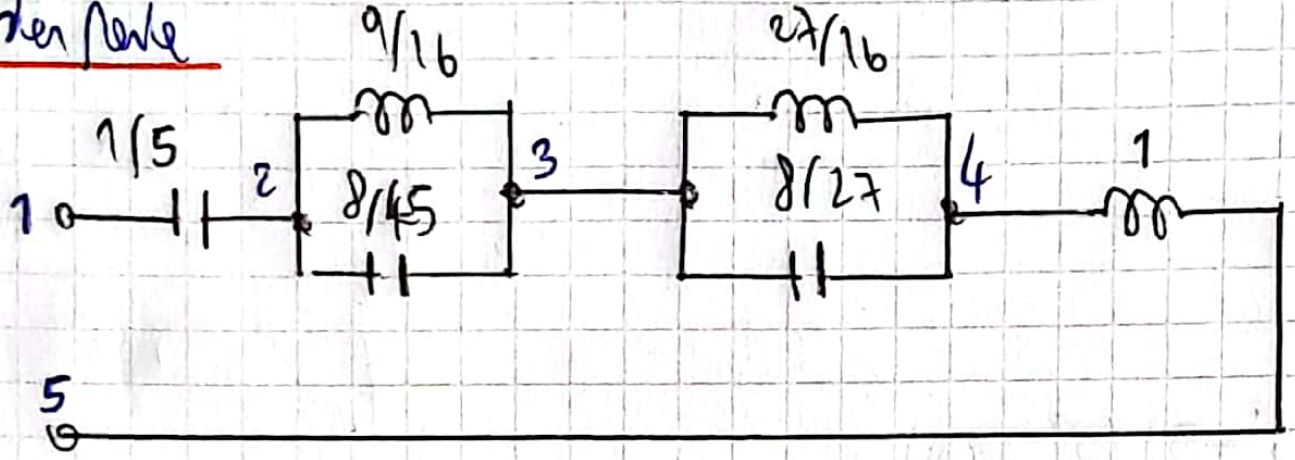
$$2K_2 = \lim_{s^2\to -2} \frac{\cancel{s^2+2}}{s} \cdot \frac{(s^2+1)(s^2+5)(s^2+20)}{s(s^2+10)(\cancel{s^2+2})} = \frac{(-1)(3)(18)}{(-2)(8)}$$

$$2K_2 = \frac{27}{8}$$

$$K_\infty = \lim_{s\to\infty} \frac{Y(s)}{s} = \lim_{s\to\infty} \frac{(s^2+1)(s^2+5)(s^2+20)}{s^2(s^2+10)(s^2+2)} = \underline{1}$$



Foster forma



$$Y_{MAL} = \begin{pmatrix} +\frac{1}{5}s & -\frac{1}{5}s & 0 & 0 & 0 \\ +\frac{-1}{5}s & \frac{1}{5}s+\frac{8}{45}s+\frac{1}{\frac{59}{16}} & \frac{-8}{45}s-\frac{1}{\frac{59}{16}} & 0 & 0 \\ + & \frac{-8}{45}s-\frac{1}{\frac{59}{16}} & \frac{8}{45}s+\frac{16}{59}+\frac{8}{27}s+\frac{16}{275} & \frac{-8}{27}s-\frac{16}{275} & 0 \\ +0 & 0 & \frac{-8}{27}s-\frac{16}{275} & \frac{8}{27}s+\frac{1}{5}+\frac{16}{275} & -\frac{1}{5} \\ 0 & 0 & 0 & -\frac{1}{5} & \frac{1}{5} \end{pmatrix}$$

$$Z_{15} = \frac{\frac{y_{15}}{y_{15}}}{\frac{y_{11}}{-1}}$$ → Mejor resolverlo por Zuputer