

Tarea 1 Video 2. Julian Moreno C 20201005114

$$X(s) = \frac{25^3 + 8s^2 + 4s + 8}{s(s+1)(s^2+4s+8)} = \frac{k_1}{s} + \frac{k_2}{(s+1)} + \frac{A}{(s+2+j2)} + \frac{A^*}{s+2-j2}$$

$$k_1 = sX(s) \Big|_{s=0} = \frac{25^3 + 8s^2 + 4s + 8}{s(s+1)(s^2+4s+8)} = \frac{8}{8} = 1$$

$$k_2 = (s+1)X(s) \Big|_{s=-1} = \frac{(s+1)(25^3 + 8s^2 + 4s + 8)}{(s+1)(s^2+4s+8)} = \frac{10}{-5} = -2$$

$$A = (s+2+j2)X(s) \Big|_{s=-2-j2} = \frac{(s+2+j2)(25^3 + 8s^2 + 4s + 8)}{(s+2+j2)(s^2+4s+8)} = \frac{32-j24}{24+j8}$$

por partes

$$\circ 25^3 = 2(-2-j2)^3 - 2(-2j^3 + 3(-2)^2(-j2) + 3(-2)(-j2) + (-j2)^3)$$

$$25^3 = 2(16-j16) = 32-j32$$

$$\circ \text{para } 8s^2 = 8(-2-j2)^2$$

$$8s^2 = j64$$

$$\text{Numerador } 32-j32+j64+4(-j2) = 32j+j24$$

$$\text{Denominador } s(s+1)(s+2-j2) = (-2-j2)(-2-j2+1)(-2-j2+2+j2) = -24+j8$$

$$A = \frac{32+j24}{24+j8} = 1.5+j0.5$$

$$X(s) = \frac{1}{s} - \frac{2}{s+1} + \frac{1.5+j0.5}{s+2+j2} + \frac{1.5-j0.5}{s+2-j2}$$