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• Transcripción video #2.

Partial fractions ex.1

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

$$= \frac{K_1}{s} + \frac{K_2}{s+1} + \frac{A}{s+2+j2} + \frac{A^*}{s+2-j2}$$

$$K_1 = s\,X(s)\Big|_{s=0}$$

$$= \cancel{s}\cdot\frac{\cancel{2s^3}+\cancel{8s^2}+\cancel{4s}+8}{\cancel{s}(\cancel{s}+1)(\cancel{s^2}+\cancel{4s}+8)}\Bigg|_{s=0}$$

$$= 8/8 = \quad K_1 = 1.$$

$$K_2 = (s+1)\,X(s)\Big|_{s=-1.}$$

$$K_2 = \cancel{(s+1)}\frac{2s^3+8s^2+4s+8}{s\cancel{(s+1)}(s^2+4s+8)}$$

$$K_2 = \frac{2(-1)^3+8(-1)^2+4(-1)+8}{(-1)((-1)^2+4(-1)+8)}$$

$$K_2 = \frac{-2+8-4+8}{-1(1-4+8)} = \frac{10}{-1+4-8} = -\frac{10}{5} = -2.$$

$$\boxed{K_2 = -2.}$$

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

$$= \frac{K_1}{s} + \frac{K_2}{s+1} + \frac{A}{s+2+j2} + \frac{A^*}{s+2-j2}$$

$$A = (s+2+j2)\,X(s)\Big|_{s=-2-j2}$$

$$A = s+2+j2.\ \frac{2s^3+8s^2+4s+8}{s(s+1)(s^2+4s+8)}\Bigg|_{s=-2-j2}$$

$$A = \cancel{s+2+j2}.\ \frac{2s^3+8s^2+4s+8}{s(s+1)\cancel{(s+2+j2)}(s+2-j2)}\Bigg|_{s=-2-j2}$$

$$A = \frac{2s^3+8s^2+4s+8}{s(s+1)(s+2-j2)}\Bigg|_{s=-2-j2}$$

$$A = \frac{2(-2-j2)^3+8(-2-j2)^2+4(-2-j2)+8}{(-2-j2)[(-2-j2)+1][-2-j2+2-j2]}$$

• ① $2s^3 = 2(-2-j2)^3.$

$$= 2[\cancel{(-2)^3}^{-8} + \cancel{3(-2)^2(-j2)}^{-j24} + \cancel{3(-2)(-j2)^2}^{24} + \cancel{(-j2)^3}^{j8}]$$

$$(-j2)^3 = (-1)^3 j^3 2^3$$
$$= -1\cdot j^1\cdot j8$$
$$= j8$$

• $2s^3 = 32-j32.$

$\longrightarrow\ 8s^2 = 8(-2-j2)^2 = j64$

$$A = \frac{32-j32 + j64 + 4(\overset{\cancel{-8}\ \ -8j}{-2-j2}) \cancel{+8}}{(-2-j2)[(-2-j2)+1][-2-j2+2-j2]}$$

$$A = \frac{32+j24}{\text{den.}}$$

$$\text{den.} = (-2 - j2)[-2 - j2 + 1][\cancel{-2} - j2 \cancel{+2} - j2]$$

$$\text{den} = 24 + j8$$

$$A = \frac{32 + j24}{24 + j8}$$

$$A = \frac{\cancel{8}(4 + j3)}{\cancel{8}(3 + j)} = \frac{4 + j3}{3 + j} \cdot \frac{3 - j}{3 - j}$$

$$A = \frac{15 - j5}{10} = \quad A = 1.5 - j0.5$$

- Solución.

error en el video ⇄ invertir ✓

$$= \frac{1}{s} + \frac{-2}{s+1} + \frac{1.5 - 0.5j}{s + 2 + j2} + \frac{1.5 + 0.5j}{s + 2 - j2}$$