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

$$= \frac{k_1}{s} + \frac{k_2}{s+1} + \frac{A}{s+2+j2} + \frac{A^*}{s+2-j}$$

$$k_1 = s \, X_{(s)} \Big|_{s=0}$$

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

$$\underset{1}{} \qquad \underset{8}{}$$

$$k_1 = 1$$

$$k_2 = (s+1) \, X_{(s)} \Big|_{s=-1}$$

$$= (\cancel{s+1}) \frac{2s^3 + 8s^2 + 4s + 8}{s \, (\cancel{s+1})(s^2 + 4s + 8)} \Big|_{s=-1}$$

$$= \frac{2(-1)^3 + 8(-1)^2 + 4(-1) + 8}{(-1)\left((-1)^2 + 4(-1) + 8\right)} = \frac{-2 + 8 - 4 + 8}{(-1)[1 - 4 + 8]} = \frac{10}{-5}$$

$$k_2 = -2$$

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

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

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

$$2s^3 = 2[-2 - j2]^3$$

$$= 2\left[(-2)^3 + 3(-2)^2(-j2) + 3(-2)(-j2)^2 + (-j2)^3\right]$$

$$(j2)^3 = (-1)^3 j^3 2^3$$

$$= -1 j^2 j 8$$

$$= -8(-1)j = j8$$

$$2s^3 = 2[-8 - j24 + 24 + j8]$$

$$= 2[16 - j16]$$

$$2s^3 = 32 - j32$$

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

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

Numerador $\quad 32 - j32 + j64 + 4(-2-j2) + 8$

$32 - j24 \qquad \qquad \underbrace{-8 - j8 + 8}$

denominador

$s(s+1)(s+2-j2) = (-2-j2)(-2-j2+1)(-2-j2+2+j2)$

$\qquad \qquad = 24 + j8$

$$A = \frac{32 + j24}{24 + j8} = \frac{8(4+j3)}{8(3+j)} \cdot \frac{3-j}{3-j} = \frac{15 - j5}{10}$$

$$A = 1{,}5 - j0{,}5$$

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