

7.2 5

Ex A details

$$\frac{(s+6)(s-2)+1}{(s+3)(s+1)(s-2)} = \frac{A}{s+3} + \frac{B}{s+1} + \frac{C}{s-2}$$

multiply by denominator to focus on numerator

$$(s+6)(s-2)+1 = A(s+1)(s-2) + B(s+3)(s-2) + C(s+3)(s+1)$$

$$\begin{aligned} s = -1 \quad 5 \cdot (-3) + 1 &= 0 + B(2)(-3) + 0 \\ -14 &= -6B \\ \frac{7}{3} &= B \end{aligned}$$

$$\begin{aligned} s = 2 \quad 8 \cdot 0 + 1 &= 0 + 0 + C(5)(3) \\ 1 &= 15C \\ \frac{1}{15} &= C \end{aligned}$$

$$\begin{aligned} s = -3 \quad (3)(-5) + 1 &= A(-2)(-5) + 0 + 0 \\ -14 &= 10A \\ -\frac{7}{5} &= A \end{aligned}$$

7.5 2

Partial Fractions

$$\frac{c}{s-2} + \frac{b}{s+1} + \frac{a}{s+2} = \frac{1 + (s-2)(s+2)}{(s-2)(s+1)(s+2)}$$

Multiply both sides by denominator to focus on numerators

$$(s+2)(s+1)c + (s-2)(s+2)b + (s-2)(s+1)a = 1 + (s-2)(s+2)$$

$s = -1$

$$0 + 0 + 0 = 1 + 0 - 8$$

$$-14 = -14$$

$$\frac{14}{4} = b$$

$s = 2$

$$0 + 0 + 0 = 1 + 0 - 8$$

$$-7 = -7$$

$$\frac{7}{3} = c$$

$s = -2$

$$0 + 0 + 0 = 1 + (2-)(2)$$

$$-14 = -14$$

$$A = \frac{14}{3}$$