

punto 1.

$$g(k) = \begin{cases} 0.2(0.8)^k - 0.1(0.4)^k & k \geq 0 \\ 0 & k < 0 \end{cases}$$

usando transformada $\frac{z}{z-a}$

$$G(z) = 0.2 \cdot \frac{z}{z-0.8} - 0.1 \cdot \frac{z}{z-0.4}$$

punto 2

$$F(z) = \frac{z(z-0.4)}{(z-0.5)(z-0.6)}$$

$$\frac{z(z-0.4)}{(z-0.5)(z-0.6)} = \frac{A}{z-0.5} + \frac{B}{z-0.6}$$

$$z(z-0.4) = A(z-0.6) + B(z-0.5)$$

haciendo $z=0.5$

$$0.5(0.5-0.4) = A(0.5-0.6) + B(0.5-0.5)$$

$$A = 0.5$$

ahora haciendo $z=0.6$

$$(0.6)(0.6-0.4) = A(0.6-0.6) + B(0.6-0.5)$$

$$B = 1.2$$

$$F(z) = \frac{-0.5}{z-0.5} + \frac{1.2}{z-0.6}$$

$$f(k) = -0.5(0.5)^k + 1.2(0.6)^k \quad k \geq 0$$

Evaluando $K = 1, 2, 3, 4, 5, 6$

para $K = 1$, $f(K) = 0.47$

para $K = 2$, $f(K) = 0.307$

para $K = 3$, $f(K) = 0.1967$

para $K = 4$, $f(K) = 0.12427$

para $K = 5$, $f(K) = 0.07769$

para $K = 6$, $f(K) = 0.04817$

ahora, el valor final:

$$\lim_{z \rightarrow 1} (1-z^{-1}) f(z)$$

$$\lim_{z \rightarrow 1} (1-0) \cdot (1(1-0.4)) / ((1-0.5) \cdot (1-0.6))$$

valor final igual a 0.