

Ejercicio 7

$$\frac{e^{(2w-3)i}}{(5-(3-w)i)} = \frac{e^{2(w-3)i}}{5+(w-3)i} = F(w)$$

$$f(t) = e^{3it} F^{-1} \left[\frac{e^{2iw}}{5+iw} \right] = e^{3it} H(t+2) e^{-5(t+2)}$$

$$f(t) = H(t+2) e^{-(5-3i)t}$$

Ejercicio 8

$$19. 10 \sin(3w) / (w+i) \quad f(w) = \frac{e^{2(w-3)i}}{5+(w-3)i}$$

$$F(w) = \int_{-\infty}^{\infty} 10 \sin(3(w+t)) e^{-i(w+t)\tau} dt$$

$$F(t) = -3e^{-\pi t} F^{-1} \left\{ \frac{2 \sin(3w)}{w} \right\} = 5e^{-\pi t} [H(t+3) - H(t-3)]$$

Ejercicio 9

$$15 \quad \frac{1+iw}{(6-w^2+5iw)} = \frac{2}{3+iw} - \frac{1}{2+iw} = \frac{A}{3+iw} + \frac{B}{2+iw}$$

$$a=-1 \quad b=5; \quad c=6$$

$$w = \frac{-5i \pm \sqrt{25-4(1)(6)}}{-2} = \frac{-5i \pm i}{-2} = w_{1,2}$$

Fracciones Parciales

$$1+iw = A(2+iw) + B(3+iw)$$

$$1-2A+3B$$

$$1=A+B$$

$$1=2A+3B$$

$$-2=-2A-2B$$

$$[-1=B] \quad [A=2]$$

$$\begin{aligned} w_1 = 2i & \quad w_2 = 3i \\ w-2i=0 & \quad w-3i=0 \\ -iw=2 & \quad -iw=3 \\ 0=2+iw & \quad 0=3+iw \end{aligned}$$

$$f(t) = H(t)(2e^{-t} - e^{-2t})$$

Ejercicio 10

$$\begin{aligned} 16. F^{-1} \left\{ \frac{1}{(2+iw)(2-iw)} \right\} &= H(t)e^{-t} H(t)e^{-2t} \\ &= \int_{-\infty}^{\infty} H(\tau) e^{-\tau} H(t-\tau) e^{-2(t-\tau)} d\tau \\ &= H(t) e^{-2t} \int_0^t e^{\tau} d\tau = H(t) e^{-2t} (e^t - 1) \\ &= H(t) (e^{-t} - e^{-2t}) \end{aligned}$$

Ejercicio 1 Libro Oneil

$$7. f(t) = \frac{1}{(1+t^2)} = \boxed{\pi e^{-|w|}}$$

Usando Formula 19 $F\left[\frac{1}{a^2+t^2}\right] = \frac{\pi}{a} e^{-a|w|}$

Ejercicio 2

$$8. f(t) = 3H(t-2)e^{-3t}$$

Usando la formula 16 $F[H(t)e^{-at}] = \frac{1}{e^{-i\omega} + a}$

$$3H(t-2)e^{-3(t-2+2)} = 3H(t-2)e^{-3(t-2)}e^{-6}$$

$$3\left(\frac{1}{i\omega+3}\right)e^{-6} = \boxed{\frac{3e^{-6}}{i\omega+3}} = \frac{3(i\omega+3)e^{-6}}{(9+\omega^2)}$$

Ejercicio 3

$$9. f(t) = 3e^{-4|t+2|} = \boxed{3\left[\frac{8}{\omega^2+16}\right]e^{2i\omega}} = \boxed{\frac{24}{\omega^2+16}e^{2i\omega}}$$

Usando la formula 17 $F[e^{-a|t|}] = \frac{2a}{\omega^2+a^2}$

Ejercicio 4

$$10. f(t) = H(t-3)e^{-2t} = H(t-3)e^{-2(t-3+3)} = H(t-3)e^{-2(t-3)}e^{-6}$$

Usando la formula 16

$$F(w) = \frac{1}{i\omega+2}e^{-6} = \boxed{\frac{e^{-6}(4-i\omega)}{4+\omega^2}}$$

Ejercicio 5

En cada Problem 11 through 15, find the inverse Fourier transform of the function

$$11. 9e^{-(\omega+4)^2/32}$$

segun 18. $F\left[e^{-\frac{a^2}{4}t^2}\right] = e^{-a|t|}$

$$\left[9\sqrt{\frac{32}{\pi}}\frac{e^{-8t^2}}{e^{-i4t}}\right] = f(t) = 18\sqrt{\frac{2}{\pi}}e^{-8t^2}e^{-4it}$$

Ejercicio 6

$$12. e^{(20-4\omega)i} / (3-(5-\omega)i) = e^{-1} \left\{ \frac{1}{i\omega+4} \right\}$$

Usando la 16 $F^{-1}\left[\frac{e^{-a i \omega}}{3+i\omega}\right] = \left\{ e^{5it} H(t-4) e^{-3(t-4)} \right\}$



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ESCUELA SUPERIOR DE COMPUTO



LISTA DE EJERCICIOS 1-12
SEMANA 15

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