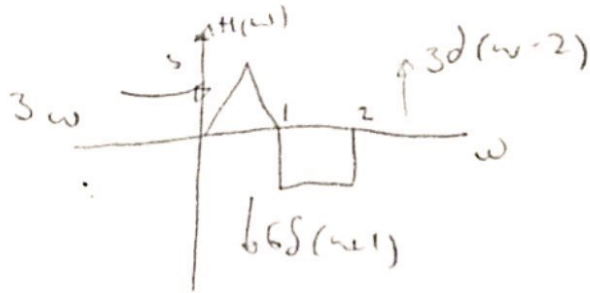


Ejercicio 1.9Encontrar la transformada inversa de  $H(\omega)$ 

$$\frac{d^2}{d\omega^2} H(\omega) = 3\delta(\omega) - 3\delta(\omega-1) - 6\delta'(\omega-1) + 3\delta'(\omega-2)$$

$$\mathcal{F}^{-1}\left\{\frac{d^2}{d\omega^2} H(\omega)\right\} = \mathcal{F}^{-1}\{3\delta(\omega)\} - \mathcal{F}^{-1}\{3\delta(\omega-1)\} - \mathcal{F}^{-1}\{6\delta'(\omega-1)\} + \mathcal{F}^{-1}\{3\delta'(\omega-2)\}$$

$$s. \delta(t) \leftrightarrow 1$$

$$1 \leftrightarrow 2\pi \delta(-\omega)$$

$$\frac{1}{2\pi} \leftrightarrow \delta(\omega)$$

$$\frac{1}{2\pi} e^{j\omega t} \leftrightarrow \delta(\omega-1)$$

$$\frac{(-jt)}{2\pi} e^{j\omega t} \leftrightarrow \delta'(\omega-1)$$

$$\frac{1}{2\pi} e^{j2\omega t} \leftrightarrow \delta(\omega-2)$$

$$\frac{(-j2t)}{2\pi} e^{j2\omega t} \leftrightarrow \delta'(\omega-2)$$

$$\mathcal{F}^{-1}\left\{\frac{d^2}{d\omega^2} H(\omega)\right\} = 3 \cdot \frac{1}{2\pi} - 3 \cdot \frac{1}{2\pi} e^{jt} - 6 \left(\frac{-jt}{2\pi}\right) e^{jt} + 3 \left(\frac{-j2t}{2\pi}\right) e^{j2t}$$

$$\therefore$$

$$\frac{3}{2\pi} - \frac{3}{2\pi} e^{jt} + \frac{j3t}{\pi} e^{jt} - \frac{j3t}{2\pi} e^{j2t} \leftrightarrow \frac{d^2}{d\omega^2} H(\omega)$$

$$s. h(t) \leftrightarrow H(\omega)$$

$$(-jt)^2 h(t) \leftrightarrow \frac{d^2}{d\omega^2} H(\omega)$$

$$(-jt)^2 h(t) = \frac{3}{2\pi} - \frac{3}{2\pi} e^{jt} + \frac{j3t}{\pi} e^{jt} - \frac{j3t}{2\pi} e^{j2t}$$

$$h(t) = \frac{1}{t^2} \left[ \frac{3}{2\pi} - \frac{3}{2\pi} e^{jt} + \frac{j3t}{\pi} e^{jt} - \frac{j3t}{2\pi} e^{j2t} \right]$$

$$h(t) = \frac{1}{t^2} \left[ \frac{3}{2\pi} (1 - e^{jt} + j^2 t^2 e^{jt} - j^2 t^2 e^{j2t}) \right]$$

$$= \frac{-3}{2\pi t^2} (1 - e^{jt} + j2te^{jt} - jte^{j2t})$$

$$h(t) = \frac{3}{2\pi t^2} (e^{jt} + jte^{j2t} - j2te^{jt} - 1)$$