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EQUAÇÕES:

$$x(t) = \sum_{k=-\infty}^{\infty} a_k \, e^{jk(2\pi/T)t}$$ EQUAÇÃO de SÍNTESE (*1)

$$a_k = \frac{1}{T} \int_T x(t) \, e^{-jk(2\pi/T) \cdot t} \, dt$$ EQUAÇÃO de ANÁLISE (*2)

PARTE 1)

1 c) 2 intervalos $\rightarrow [0,2], [2,4]$

RAMPA

(*2) $$a_{k_1} = \int_0^2 t \cdot e^{-jk(\pi/2) \cdot t} \cdot dt = \frac{-4}{(k^2 \cdot \pi^2)} + \frac{(2e^{-j\pi k})(2j\pi k + 2)}{(k^2 \pi^2)}$$

(*2) $$a_{k_2} = \int_2^4 t \cdot e^{-jk(\pi/2)t} \cdot dt = -\frac{((2e^{-j\pi k})(2j\pi k + 2))}{k^2 \pi^2} + \ldots$$

$$+ \frac{((2e^{-2j\pi k})(4j\pi k + 2))}{(k^2 \pi^2)}$$

(*2) $$a_{k_3} = 4 \int_2^4 e^{-jk(\pi/2)t} \cdot dt = \frac{-j8 \, (e^{-j\pi k} - e^{-2j\pi k})}{k\pi}$$

(*2) $$a_k = \frac{1}{4} \left(\int_0^2 t e^{-jk(\pi/2)t} \, dt - \int_2^4 t e^{-jk(\pi/2)t} \cdot dt + 4 \int_2^4 e^{-jk(\pi/2)t} \cdot dt \right)$$

$$a_K = \frac{-1}{(K^2\pi^2)} - \frac{\left(e^{-j\pi K} - 2j\left(e^{-j\pi K}\right)\right)}{K\pi} + \frac{\left(\left(e^{-j\pi K}\right)(2j\pi K + 2)\right)}{K^2\pi^2} - \ldots$$

$$- \frac{\left(\left(e^{-2j\pi K}\right)(4j\pi K + 2)\right)}{2K^2\pi^2}$$

$$(*1) \quad \sum_{K=-\infty}^{\infty} a_K e^{jK(\pi/2)t}$$

$\rightarrow$ arredondados

c-2) intervalos deslocados $\rightarrow [0{,}5\ ,\ 3{,}5],\ [1{,}5\ ,\ 2{,}5]$

$$a_{K_1} = \int_{0,5}^{3,5} e^{-jK(\pi/2)t}\,dt = -2j\frac{\left(e^{(-j\pi K)/4} - e^{(-j7\pi K)/4}\right)}{K\pi}$$

$$a_{K_2} = \int_{1,5}^{2,5} e^{-jK(\pi/2)t}\,dt = -2j\frac{\left(e^{(-j3\pi K)/4} - e^{(-5j\pi K)/4}\right)}{K\pi}$$

$$a_K = \frac{1}{4}\left(\int_{0,5}^{3,5} e^{-jK(\pi/2)t}\,dt + \int_{0,5}^{3,5} e^{-jK(\pi/2)t}\,dt\right)$$

$$a_K = -j\frac{\left(e^{(-j\pi K)/4} - e^{(-j7\pi K)/4}\right)}{2K\pi} - j\frac{\left(e^{(-j3\pi K)/4} - e^{(-j5\pi K)/4}\right)}{2K\pi}$$

$$(*1) \quad \sum_{n=-\infty}^{\infty} a_K e^{jK(\pi/2)t}$$

c-3) 2 intervalos → [-1, 1], [1, 3]

$$a_k = \frac{1}{4}\left(\int_{-1}^{1} (t+1)\, e^{-j\pi/2\, kt}\, dt + \int_{1}^{3} -t\, e^{-jk\pi/2\, t}\, dt + 3\int_{1}^{3} e^{-jk\pi/2\, t}\, dt\right)$$

$$a_k = -j3\left(\frac{e^{(-j\pi k)/2} - e^{(-j3\pi k)/2}}{2 \cdot k\pi}\right) - \left[2\frac{1}{2}\left(\frac{e^{-j\pi k/2}}{2} - \frac{e^{j\pi k/2}}{2}\right)\right.\cdot$$

$$\cdot\ \frac{1}{j\frac{4}{2}k\pi\,(1/2)\cdot(j k\pi/4)(1/2)} + \left(\frac{e^{-jk\pi/2}(j\pi k+2)}{k^2 \cdot \pi^2}\right) + \left(\frac{e^{j\pi k/2}(j\pi k-2)}{2k^2\pi^2}\right)$$

$$-\left(\frac{e^{-j3\pi k/2}(j3\pi k+)}{2k^2\pi^2}\right).$$

$$\sum_{m=-\infty}^{\infty} a_k\, e^{-j\pi k/2}$$

c-4) 2 intervalos [0,25, 1,75] e [0,75 e 1,25]

$$a_k = \frac{1}{2}\left(\int_{0,25}^{1,75} e^{-j\pi kt}\, dt + \int_{0,75}^{1,25} e^{-j\pi kt}\, dt\right)$$

$$a_k = -j\left(\frac{e^{(-j\pi k)/4} - e^{-j7\pi k/4}}{2k\pi}\right) - j\left(\frac{e^{-j3\pi k/4} - e^{(-j5\pi k/4)}}{2k\pi}\right)$$

$$\sum_{m=-\infty}^{\infty} a_k\, e^{jk\pi t}.$$

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