Sistemas e Sinais

$$T_0 = 2s;\ f_0 = \frac{1}{2};\ \omega_0 = \pi$$

$$\Delta(t) = \begin{cases} t+1 & -1 < t < 0 \\ -t+1 & 0 < t < 1 \end{cases}$$

$$P_g = \int_{-1}^{0} (t+1)^2 d\tau + \int_{0}^{1} (1-\tau)^2 d\tau = 0{,}666\ldots$$

$$D_n = \frac{1}{2}\left[\overbrace{\int_{-1}^{0} (\tau+1) . e^{-j\omega_0 n\tau} d\tau}^{(1)} + \overbrace{\int_{0}^{1} (1-\tau) . e^{-j\omega_0 n\tau} d\tau}^{(2)} \right]$$

$$D_{n(1)} = \frac{1}{2}\left[\int_{-1}^{0} (\tau+1) . e^{-j\omega_0 n\tau} d\tau \right] = \frac{1}{2}\left[\frac{(\tau+1) . e^{-j\omega_0 n\tau}}{-j\omega_0 n} - \frac{e^{-j\omega_0 n\tau}}{(j\omega_0 n)^2} \right]\Bigg|_{-1}^{0}$$

$$D_{n(1)} = \frac{1}{2}\left[\left(\frac{-1}{j\omega_0 n} - 0 \right) + \left(\frac{e^{0}}{(j\omega_0 n^2)} - \frac{e^{j\omega_0 n}}{(j\omega_0 n^2)} \right) \right]$$

$$D_{n(1)} = \frac{1}{2}\left[\frac{-1}{j\omega_0 n} + \frac{1 - e^{j\omega_0 n}}{\omega_0 n^2} \right]$$

$$D_{n(2)} = \frac{1}{2}\left[\int_{0}^{1} (1-\tau) . e^{-j\omega_0 n\tau} d\tau \right] = \frac{1}{2}\left[\frac{(1-\tau) . e^{-j\omega_0 n\tau}}{-j\omega_0 n} + \frac{e^{-j\omega_0 n\tau}}{(-j\omega_0 n)^2} \right]\Bigg|_{0}^{1}$$

$$D_{n(2)} = \frac{1}{2}\left[+\frac{1}{j\omega_0 n} + \frac{1 - e^{-j\omega_0 n}}{(\omega_0 n)^2} \right]$$