15-03-2003 | $x(t)$ CON PULSAZIONE FONDAMENTALE ω_0

(1) $x(t) = \sum_{n=-\infty}^{+\infty} c_n e^{jn\omega_0 t}$ (2) $G_{xB/2}(\omega) = \sum_{n=-\infty}^{+\infty} |c_n|^2 \delta(\omega - n\omega_0)$

(3) $H(\omega) = \frac{1}{1+j\omega CR}$ CON $\frac{1}{CR} = \omega_0$ (4) $y(t) = \sum_{n=-\infty}^{+\infty} H(n\omega_0) X_n e^{jn\omega_0 t}$

SE I COEFFICIENTI DI $x(t)$ SONO

$c_0 = B \qquad c_n = j\frac{A}{n}(-1)^n \quad \forall n \neq 0$

$G_{yB/2}(\omega) = |H(\omega)|^2 G_{xB/2}(\omega) \Rightarrow G_{yB/2}(\omega) = \sum_{n=-\infty}^{+\infty} |H(n\omega_0)|^2 |c_n|^2 \delta(\omega - n\omega_0)$

PER LA PRIMA ARMONICA:

$G_{yB/2}(\omega) = |H(\omega_0)|^2 |c_1|^2 \delta(\omega - \omega_0) = \frac{1}{2} \cdot A\, \delta(\omega - \omega_0)$

$G_{yB/2}(\omega) = \frac{F[C_y(\tau)]}{2\pi} \Rightarrow C_y(\tau) = F^{-1}[2\pi G_{yB/2}(\omega)]$

$C_y(\tau) = \frac{1}{2\pi} \int_{-\infty}^{+\infty} 2\pi \cdot \frac{A}{2} \delta(\omega - \omega_0) e^{j\omega\tau} d\omega = \frac{A}{2} \int_{-\infty}^{+\infty} \delta(\omega - \omega_0) e^{j\omega\tau} d\omega = \frac{A}{2} e^{j\omega_0\tau}$

$P_y = C_y(0) = \frac{A}{2} e^{j\omega_0 0} = \frac{A}{2}$