$X_k = 0$ all others

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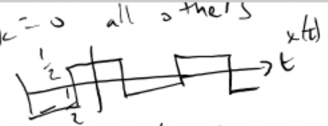
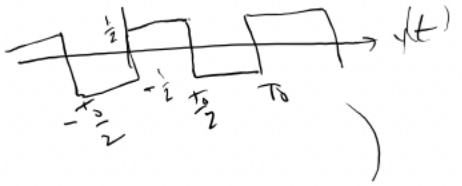


even symmetry
$y(t) = x(-t)$
like a cosine

$$X_k = \begin{cases} 0 & k \text{ even} \\ \frac{(-1)^{\left(\frac{|k|-1}{2}\right)}}{\pi k} & k \text{ odd} \end{cases}$$



odd symmetry
$y(t) = -y(-t)$
like a sine

Apply spectral properties of delay

$$x(t) = \sum X_k e^{+j2\pi kt/T_0}$$

$$y(t) = x(t-\tau) = \sum X_k e^{+j2\pi k(t-\tau)/T_0}$$

$$= \sum_k X_k e^{-j2\pi k\tau/T_0} e^{+j2\pi kt/T_0}$$

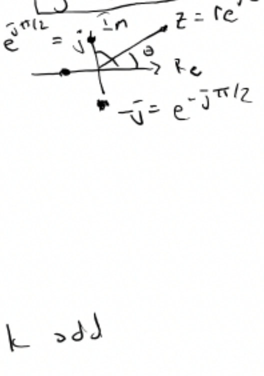
THEN

$$Y_k = X_k e^{-j2\pi k\tau/T_0} = X_k e^{-j\cancel{2}\pi k \cancel{T_0}/\cancel{4}\cancel{T_0}\,2} = X_k e^{-j\pi k/2}$$

$\tau = T_0/4$

$$= X_k(-j)^k$$

$$-j = e^{j3\pi/2} = e^{-j\pi/2} \quad -1 = e^{j\pi} = e^{-j\pi} \quad \boxed{j = e^{j\pi/2}}$$



$$X_k = \begin{cases} 0 & k \text{ even} \\ \frac{(-1)^{\left(\frac{|k|-1}{2}\right)}}{\pi k} & k \text{ odd} \end{cases}$$

$$Y_k = \begin{cases} 0 & k \text{ even} \\ \frac{(-1)^{\left(\frac{|k|-1}{2}\right)}}{\pi k}(-j)^k & k \text{ odd} \end{cases}$$

$= \frac{-j}{\pi} \quad k = 1 \qquad -\frac{j}{\pi 3} \quad k = 3$

$\frac{j}{\pi} \quad k = 1 \qquad \frac{j}{\pi 3} \quad k = -3$

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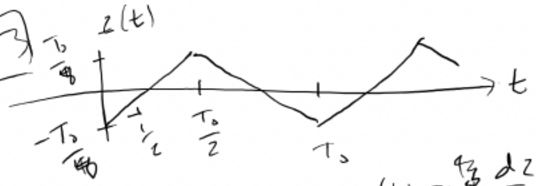

$y(t) = \frac{dz}{dt}$

$\frac{dz}{dt} = y(t) \qquad y(t) = \frac{dz}{dt}$

$$Y_k = \left(\frac{j2\pi k}{T_0}\right) Z_k$$

$$Z_k = \frac{T_0}{j\pi k 2} Y_k = \begin{cases} 0 & k \text{ even} \\ \frac{(-1)^{\left(\frac{|k|-1}{2}\right)}}{\pi k}(-j)^k \cdot \frac{T_0}{j\pi k 2} & k \text{ odd} \end{cases}$$