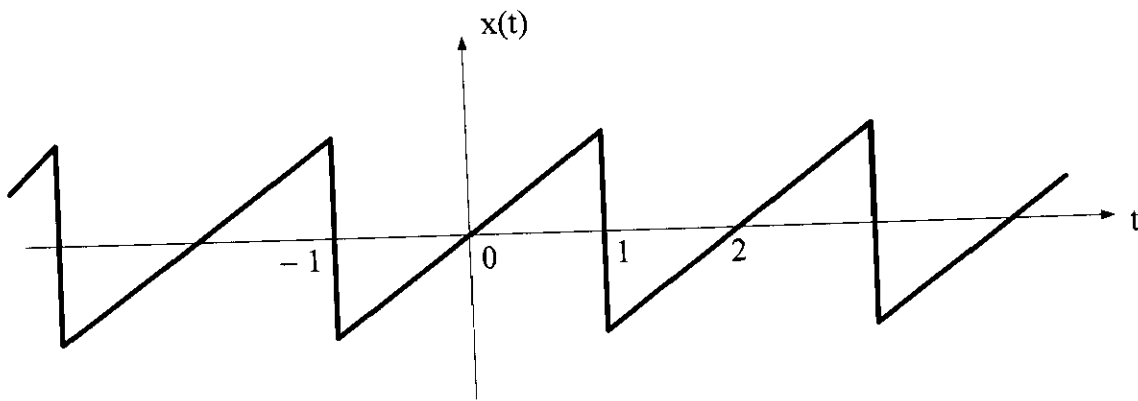


EE 207 - Fall 2009  
Quiz 3

SER	ID	NAME
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For the periodical signals  $x(t)$  shown above, find the Fourier Series coefficients  $a_0, a_n, b_n$ ?

$x(t)$  is an odd function  $\Rightarrow a_0 = 0 \quad a_n = 0$

$$b_n = \frac{2}{T_0} \int_{T_0} x(t) \sin 2\pi n f_0 t \, dt$$

$$= \frac{2}{2} \int_{-1}^1 t \sin 2\pi n t \frac{1}{2} \, dt = \int_{-1}^1 t \sin \pi n t \, dt$$

Integrating by parts

$$u = t \Rightarrow du = dt$$

$$dv = \sin \pi n t \, dt \quad v = -\frac{\cos \pi n t}{\pi n}$$

$$b_n = uv \Big|_{-1}^1 - \int_{-1}^1 v \, du = t \left( -\frac{\cos \pi n t}{\pi n} \right) \Big|_{-1}^1 + \int_{-1}^1 \frac{\cos \pi n t}{\pi n} \, dt$$

$$= -\frac{2 \cos \pi n}{\pi n} = -\frac{2(-1)^n}{\pi n} = \frac{2(-1)^{n+1}}{\pi n}$$