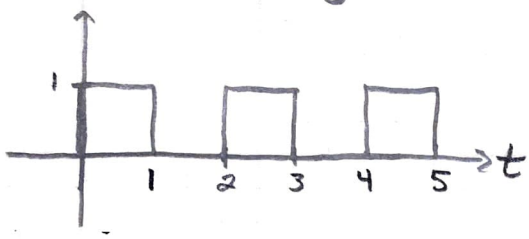
Gabriel Emerson gte0002 HW12 Due 3/31

1.)



$a_0 = \frac{A\tau}{T}$ $\quad \tau = 1,\ T = 2,\ A = 1$

$a_k = \frac{A}{k\pi}\sin(k\omega_0\tau)$

$b_k = \frac{A}{k\pi}\left[1 - \cos(k\omega_0\tau)\right]$

$a_0 = \frac{1}{T}\int_0^T x(t)\,dt \Rightarrow \frac{A\tau}{T}$

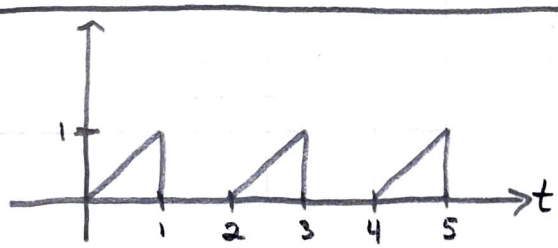
$a_k = \frac{2}{T}\int_0^\tau A\cos(k\omega_0 t)\,dt \Rightarrow \frac{2A}{T}\cdot\frac{1}{k\omega_0} - \int_0^\tau d\sin(k\omega_0 t)$

$= \frac{A}{k\pi}\sin(k\omega_0\tau)$

$b_k = \frac{2}{T}\int_0^\tau A\sin(k\omega_0 t)\,dt \Rightarrow \frac{A}{k\pi}\left[1 - \cos(k\omega_0\tau)\right]$

2.)

$T = 2$
$A = 1$



$a_0 = \frac{A}{2}$ $\quad a_k = 0$

$b_k = \frac{-A}{\pi k}$

$a_0 = \frac{1}{T}\int_0^T x(t)\,dt \Rightarrow \frac{A}{2}$

$a_k = \frac{2}{T}\int_0^T \frac{A}{T}t\cos(k\omega_0 t)\,dt = \frac{-2A}{T^2}\left[\frac{1}{k\omega_0}\int_0^T \sin(k\omega_0 t)\,dt\right]$ $\Rightarrow = 0$

$a_k = 0$

$b_k = \frac{2}{T}\int_0^T \frac{A}{T}t\sin(k\omega_0 t)\,dt = \frac{-A}{\pi k}$