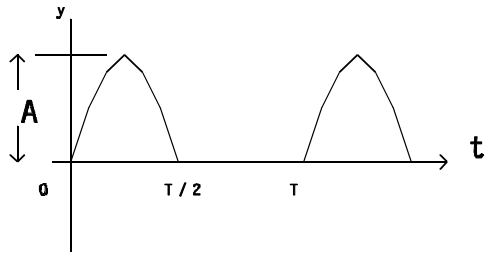
# Fourier Series Coefficients for Standard Waveforms

1. Half-Wave Rectified Sine Wave

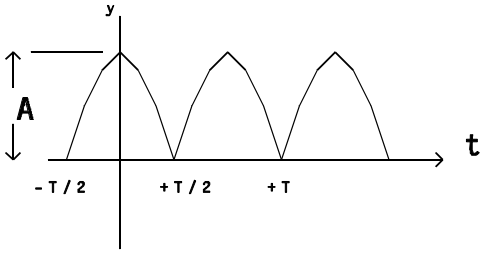



$a_0$ =DC Average = $A / \pi$

$b_1 = A/2$

$$a_n = \frac{A[\,1 + (-1)^n\,]}{\pi\,(\,1 - n^2)} \quad \text{(For N=2 to infinity)}$$

2. Full-Wave Rectified Sine Wave

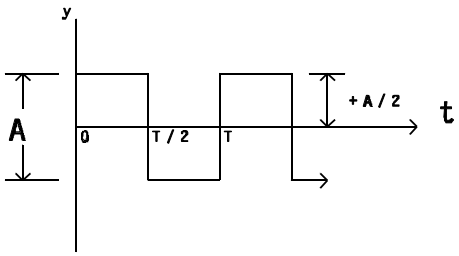



$a_0$ =DC Average = $2A / \pi$

$b_n = 0$ (No Sines in this expansion)

$$a_n = \frac{4A\,(-1)^n}{\pi\,(\,1 - 4n^2\,)}$$

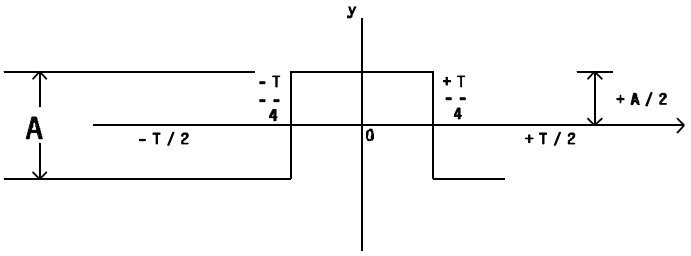
3. Square Wave - Sine Expansion




$a_0$ =0 (When symmetrical around x-axis)

$b_n = 2A / (n\pi)$ (N Odd, A=p-p value)

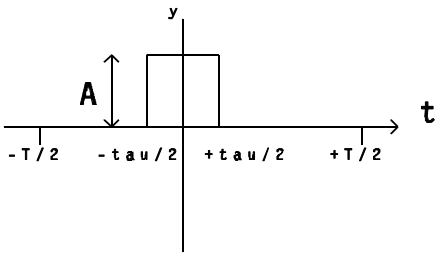
4. Square Wave - Cosine Expansion




$a_0$ =0 (When symmetrical around x-axis)

$$a_n = \frac{A \sin(n\pi / 2)}{(n\pi / 2)} \quad \text{(Zero for even N)}$$

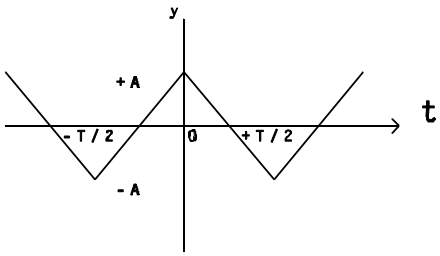
5. General Pulse Waveform




$a_0 = A\,\tau / T$

$$a_n = (2\,A\,\tau / T)\,\frac{\sin(n\,\pi\,\tau / T)}{(n\,\pi\,\tau / T)}$$

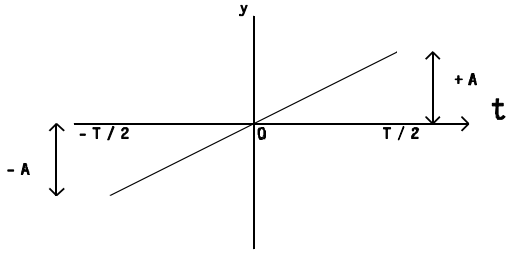
6. Symmetrical Triangle




$a_0 = 0$ (When symmetrical around x-axis)

$a_n = 8A / (n\,\pi)^2$ (For Odd N only)

7. Sawtooth




$a_0 = 0$ (When symmetrical around x-axis)

$$a_n = \frac{2A}{n\,\pi}\,(-1)^{n+1}$$ (For all N)