Table of Fourier Series

The table below assumes a Fourier series representation of the form

$$f(t) = a_0 + \sum_{n=1}^{\infty} \left[a_n \cos(n\omega_0 t) + b_n \sin(n\omega_0 t) \right] \qquad \text{where } \omega_0 = \frac{2\pi}{T}$$

The signal must be periodic with a period T

Time Domain	Frequency Domain	
a. Pulse $d = k/T$		$a_0 = A d$ $a_n = \dfrac{2A}{n\pi} \sin(n\pi d)$ $b_n = 0$ ($d = 0.27$ in this example)
b. Square		$a_0 = 0$ $a_n = \dfrac{2A}{n\pi} \sin\left(\dfrac{n\pi}{2}\right)$ $b_n = 0$ (all even harmonics are zero)
c. Triangle		$a_0 = 0$ $a_n = \dfrac{4A}{(n\pi)^2}$ $b_n = 0$ (all even harmonics are zero)
d. Sawtooth		$a_0 = 0$ $a_n = 0$ $b_n = \dfrac{A}{n\pi}$
e. Rectified		$a_0 = 2A/\pi$ $a_n = \dfrac{-4A}{\pi(4n^2 - 1)}$ $b_n = 0$