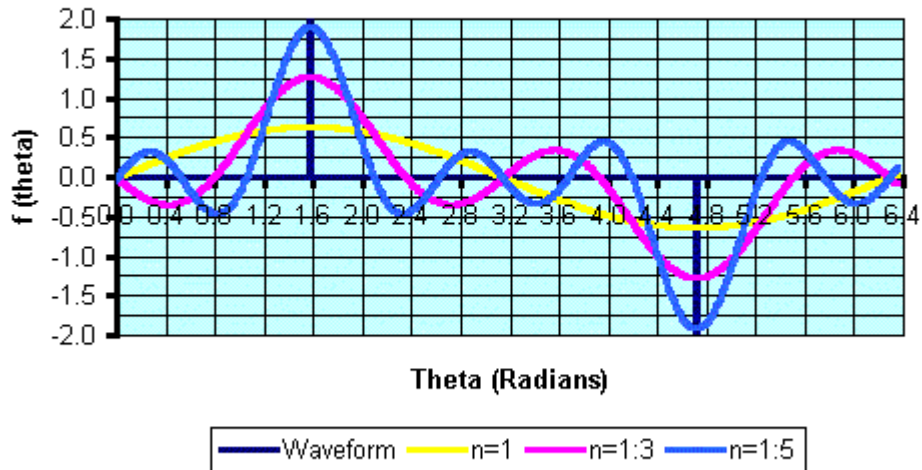


The following two figures show the “Fourier construction” of a periodic, bipolar, 50% duty-cycle unit-amplitude delta-function wave. The waveforms in these figures were generated using truncated, finite-term version(s) of the Fourier series expansion for this waveform:

$$f(\theta) \Big|_{\substack{\delta\text{-fcn} \\ \text{-wave}}} = \frac{2}{\pi} \sum_{m=1}^{m=\infty} (-1)^{m-1} \sin[(2m-1)\theta] = \frac{2}{\pi} \{\sin \theta - \sin 3\theta + \sin 5\theta - \sin 7\theta + \sin 9\theta - \dots\}$$

The first figure shows the bipolar delta-function wave (labelled as “Waveform”) overlaid with three other waveforms: that associated with just the fundamental (“ $n = 1$ ”), then the waveform associated with fundamental + 3rd harmonic (“ $n = 1:3$ ”), then the waveform associated with fundamental + 3rd + 5th harmonic (“ $n = 1:5$ ”).

Fourier Construction of a Bipolar Delta-Function



The second figure shows the bipolar delta-function wave (labelled as “Waveform”) overlaid with three other waveforms: that associated with the fundamental through the 7th harmonic (“ $n = 1:7$ ”), then the waveform associated with fundamental through the 9th harmonic (“ $n = 1:9$ ”), then the waveform associated with fundamental through the 13th harmonic (“ $n = 1:13$ ”).