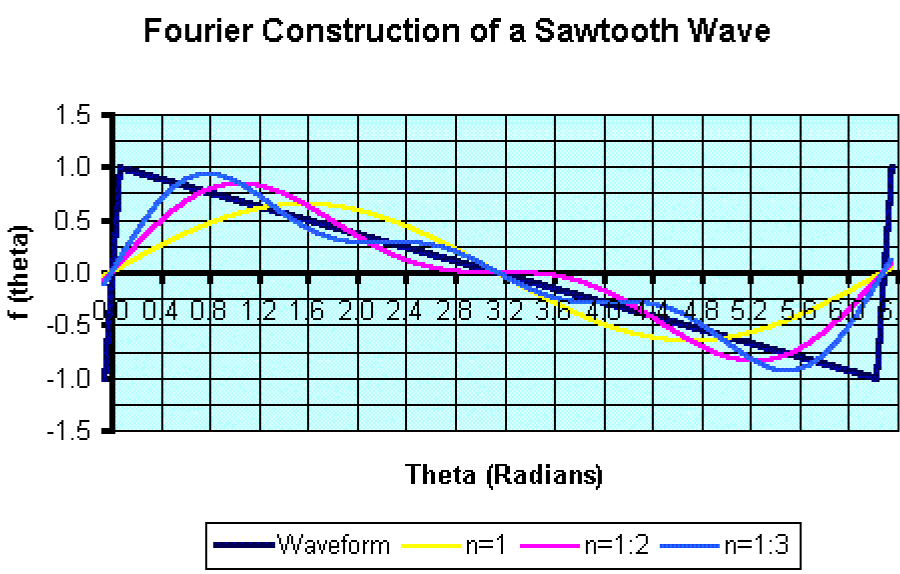
The following two figures show the "Fourier construction" of a periodic, bipolar, unit-amplitude sawtooth wave. The waveforms in these figures were generated using truncated, finite-term version(s) of the Fourier series expansion for this waveform:

$$f(\theta)\Big|_{\substack{sawtooth\\-wave}} = \sum_{n=1}^{n=\infty} b_n \sin(n\theta) = 2\left[\frac{2\alpha_p}{(1-2\alpha_p)}\right] \sum_{n=1}^{n=\infty} \left(\frac{1}{2n\pi\alpha_p}\right)^2 \sin(2n\pi\alpha_p)\sin(n\theta)$$

The first figure shows the bipolar sawtooth wave (labelled as "Waveform") overlaid with three other waveforms: that associated with just the fundamental ("n = 1"), then the waveform associated with fundamental + 2^{nd} harmonic ("n = 1:2"), then the waveform associated with fundamental + 2^{nd} + 3^{rd} harmonic ("n = 1:3"). It can be seen that using just these first three harmonics, that the replication of the sawtooth waveform is not very good, because of the extremely sharp/rapid changes in this waveform at its ends.



The second figure shows the bipolar sawtooth wave (labelled as "Waveform") overlaid with three other waveforms: that associated with the fundamental through the 5^{th} harmonic ("n = 1:5"), then the waveform associated with fundamental through the 6^{th} harmonic ("n = 1:6"), then the waveform associated with fundamental through the 7^{th} harmonic ("n = 1:7")