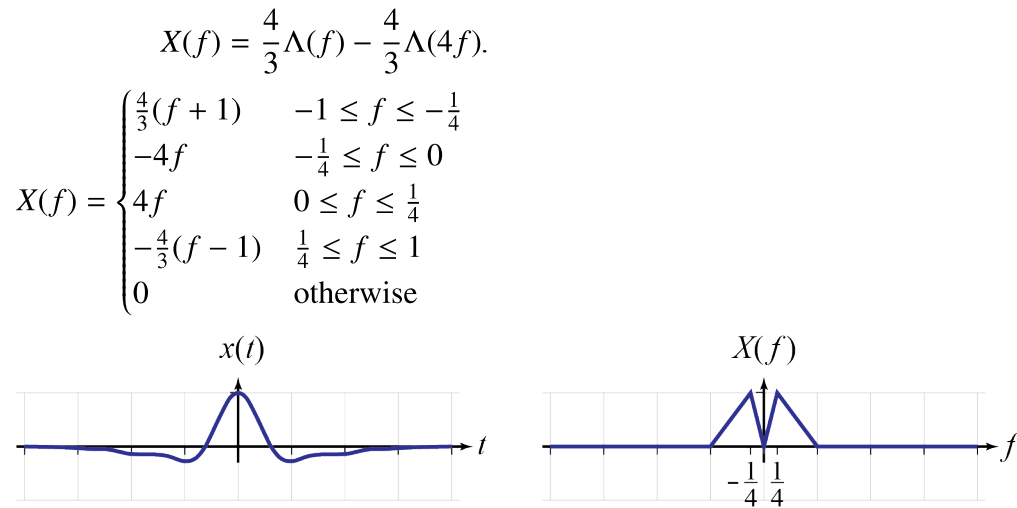


TOOL: The spectrum of a sampled signal has copies of the continuous-time spectrum repeated at the sampling frequency. The tails of the spectrum overlap and sum. If there is an equivalent pole/zero expression in Z-domain for the sampled spectrum, the sum of all the overlapping tails is obtained directly from distances to poles and zeros.

Here, the infinite sum of overlapping tails is calculated for a simple exponential function example and compared with calculation based on poles and zeros.



The spectrum may be expressed in terms of triangle (or Lambda) functions:

$$X(f) = \frac{4}{3}\Lambda(f) - \frac{4}{3}\Lambda(4f).$$

The time-domain waveform may, likewise, be expressed in terms of sinc functions:

$$x(t) = \frac{4}{3}\text{sinc}^2(t) - \frac{1}{3}\text{sinc}^2(t/4).$$