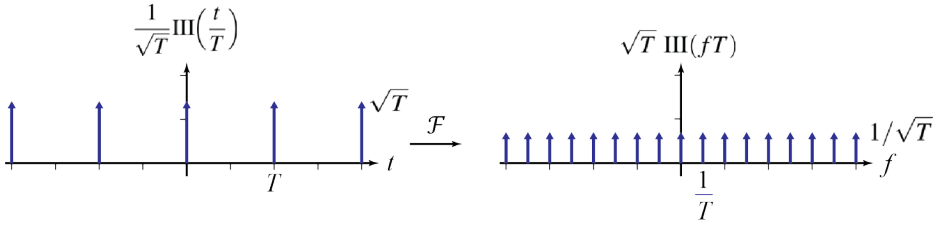

TOOL: When an impulse train is time-scaled, a factor of the sampling period, T, makes the calculation of relative amplitude in the time and frequency domains somewhat confusing. That is, the identity is asymmetric in its initial form. The form shown below makes the identity more symmetric, but the areas of the impulses in both the time and frequency domains are the *inverse* of the scaling factors.

$$\mathcal{F}\left\{\frac{1}{\sqrt{T}}\text{III}\left(\frac{t}{T}\right)\right\} = \sqrt{T}\ \text{III}(fT)$$

Impulses are spaced by T in the time-domain and by $1/T$ in the frequency domain.

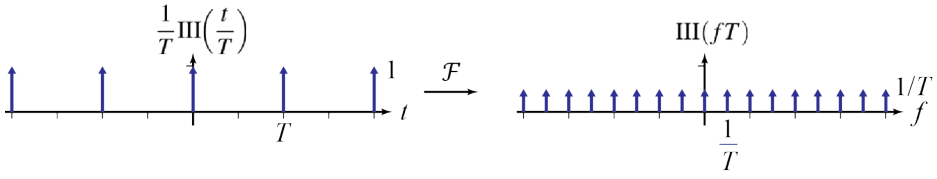


impulse areas = $\sqrt{T}$ impulse areas = $\dfrac{1}{\sqrt{T}}$

TOOL: If unit height impulses in the time domain are desired for an impulse train with sampling period T, (e.g., for sampling a waveform), the form shown below may be used for the time and frequency domain. Note the curious asymmetry of the time-domain and frequency-domain forms.

$$\mathcal{F}\left\{\frac{1}{T}\text{III}\left(\frac{t}{T}\right)\right\} = \text{III}(fT)$$

Impulses are spaced by T in the time-domain and by $1/T$ in the frequency domain.



impulse areas = 1 impulse areas = $\dfrac{1}{T}$