We know

\[ 1 \equiv \int_{-\infty}^{\infty} 1 \cdot e^{-j2\pi ft} dt = \lim_{T \to \infty} \int_{-T}^{T} 1 \cdot e^{-j2\pi ft} dt = \lim_{T \to \infty} G_T(f), \]  

where

\[ G_T(f) = \int_{-T}^{T} 1 \cdot e^{-j2\pi ft} dt \]

\[ = \frac{1}{-j2\pi f} (e^{-j2\pi fT} - e^{j2\pi fT}) \]

\[ = \frac{1}{-j2\pi f} (-2j) \sin(2\pi fT) \]

\[ = \frac{\sin(2\pi fT)}{\pi f} = \frac{\sin(2\pi fT)}{2\pi fT} 2T. \]  

Fig.1 is a plot of \( G_T(f) \) versus \( f \) under different values of \( T \). We can see as \( T \) gets larger, the peak of \( G_T(f) \) becomes higher. Meanwhile, the mainlobe of \( G_T(f) \) which is centered at \( f = 0 \) becomes more squeezed, and the difference between mainlobe peak and other sidelobe peaks becomes larger also. Hence it is not hard to imagine that as \( T \) goes to \( \infty \), \( G_T(f) \) goes to \( \delta(f) \).