

$c = 3 \times 10^8$ m/s (in free space), $c = 2 \times 10^8$ m/s (in media), $1 \text{ km} = 10^3$ m, $1 \text{ ms} = 10^{-3}$ s, $1 \text{ Mb} = 10^6$ b

$$\mathcal{F}\{\text{rect}(t/T)\} = T \text{sinc}(fT) = T \sin(\pi fT)/\pi fT$$

$$\mathcal{F}\{\text{sinc}(t/T)\} = \frac{1}{T} \text{rect}(fT), \mathcal{F}\{e^{j\omega_0 t}\} = \delta(f - f_0)$$

$$\mathcal{F}\{1 - |\tau|/T\} = T \text{sinc}^2(fT), X(e^{j\Omega}) = \sum_{n=-\infty}^{\infty} x[n]e^{-jn\Omega}$$

$$\sin(a + b) = \sin a \cos b + \cos a \sin b, \cos(a + b) = \cos a \cos b - \sin a \sin b$$

$$\sin(a \pm b) = \sin a \cos b \pm \cos a \sin b, \cos(a \pm b) = \cos a \cos b \mp \sin a \sin b$$

$$\cos^2 a = 0.5(1 + \cos 2a), \sin 2a = 2 \sin a \cos a, \cos 2a = \cos^2 a - \sin^2 a = 2 \cos^2 a - 1$$

$$\cos a = (e^{ja} + e^{-ja})/2, \sin a = (e^{ja} - e^{-ja})/j2, \tan a = \sin a / \cos a$$

$$\psi_x(f) = |X(f)|^2, G_x(f) = \sum |c_n|^2 \delta(f - nf_o), G_x(f) = \lim_{T \rightarrow \infty} |X_T(f)|^2$$

$$R_x(\tau) = \int_{-\infty}^{\infty} x(t)x(t + \tau)dt, R_x(\tau) = \lim_{T \rightarrow \infty} \frac{1}{T} \int_{-\infty}^{\infty} x(t)x(t + \tau)dt$$

$$\mathcal{F}\{R_X(\tau)\} = G_X(f), c_n = \int_{-\infty}^{\infty} x(t) \exp(-j2\pi n f_o t) dt$$

$$\text{SNR [dB]} = 10 \log(\text{SNR})$$