Important Equations

General Functions

$$\frac{de^{at}}{dt} = ae^{at} \qquad \int e^{at}dt = \frac{1}{a}e^{at}$$

$$e^{j\omega t} = \cos\omega t + j\sin\omega t \quad \text{(Euler's Identity)}$$

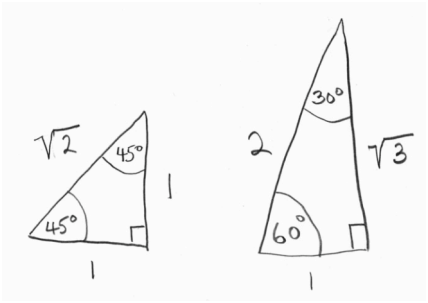
$$\cos\omega t = \mathrm{Re}\left\{e^{j\omega t}\right\} = \frac{e^{j\omega t} + e^{-j\omega t}}{2} \qquad \sin\omega t = \mathrm{Im}\left\{e^{j\omega t}\right\} = \frac{e^{j\omega t} - e^{-j\omega t}}{2j}$$

$$Ev\{x(t)\} = \frac{x(t) + x(-t)}{2} \qquad Od\{x(t)\} = \frac{x(t) - x(-t)}{2}$$

$$x(t) = Ev\{x(t)\} + Od\{x(t)\}$$

$$\partial(t) = \begin{cases} \infty, & t = 0 \\ 0, & t \neq 0 \end{cases} \qquad \int_{-\infty}^{+\infty}\partial(t) = 1 \qquad \partial[n] = \begin{cases} 1, & n = 0 \\ 0, & n \neq 0 \end{cases}$$

$$u(t) = \begin{cases} 1, & t > 0 \\ 0, & t < 0 \\ \text{indeterminate}, & t = 0 \end{cases} \qquad u[n] = \begin{cases} 1, & t \geq 0 \\ 0, & t < 0 \end{cases}$$



$$x(t) * h(t) = \int_{-\infty}^{+\infty} x(\tau)h(t-\tau)d\tau \qquad x[n] * h[n] = \sum_{k=-\infty}^{+\infty} x[k]\,h[n-k] \quad \text{(Convolution)}$$