

USEFUL FORMULAE AND OTHER INFORMATION

$$e^{j\theta} = \cos \theta + j \sin \theta$$

$$\cos \theta = \frac{1}{2} (e^{j\theta} + e^{-j\theta})$$

$$\sin \theta = \frac{1}{2j} (e^{j\theta} - e^{-j\theta})$$

θ		$\sin \theta$	$\cos \theta$	$\tan \theta$
Degrees	Radians			
0	0	0	1	0
30	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90	$\frac{\pi}{2}$	1	0	undefined
135	$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1
180	π	0	-1	0
225	$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1
270	$\frac{3\pi}{2}$	-1	0	undefined
315	$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1

$$x(t) = \sum_{k=-\infty}^{\infty} c_k e^{j(2\pi/T)kt}$$

$$c_k = \frac{1}{T} \int_T x(t) e^{-j(2\pi/T)kt} dt$$

Fourier Series Properties

Property	Time Domain	Fourier Domain
Linearity	$\alpha x(t) + \beta y(t)$	$\alpha a_k + \beta b_k$

Property	
Even Symmetry	x is even $\Leftrightarrow a$ is even
Odd Symmetry	x is odd $\Leftrightarrow a$ is odd
Real / Conjugate Symmetry	x is real $\Leftrightarrow a$ is conjugate symmetric

$$H(\omega) = \int_{-\infty}^{\infty} h(t) e^{-j\omega t} dt$$