Trigonometric Identities
$\sin(a \pm b) = \sin(a)\cos(b) \pm \sin(b)\cos(a)$
$\cos(a \pm b) = \cos(a)\cos(b) \mp \sin(a)\sin(b)$
$\sin(a)\sin(b) = \frac{1}{2}(\cos(a-b) - \cos(a+b))$
$\sin(a)\cos(b) = \frac{1}{2}(\sin(a+b) + \sin(a-b))$
$\cos(a)\cos(b) = \frac{1}{2}(\cos(a-b) + \cos(a+b))$

Particular Trigonometric Values

	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
sin	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0

Fourier Series, Period $2L$

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left[a_n \cos\left(n\frac{\pi x}{L}\right) + b_n \sin\left(n\frac{\pi x}{L}\right) \right]$$

$$a_0 = \frac{1}{2L}\int_{-L}^{L} f(x)\,dx, a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cos\left(n\frac{\pi x}{L}\right)\,dx, \quad b_n = \frac{1}{L}\int_{-L}^{L} f(x)\sin\left(n\frac{\pi x}{L}\right)\,dx.$$

Fourier transform of $f(x)$:

$$\hat{f}(k) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} f(x)e^{-ikx}\,dx.$$

$f(t)$	$\mathcal{L}(f(t))(s)$
1	$\frac{1}{s}$
t^n	$\frac{n!}{s^{n+1}}$
e^{at}	$\frac{1}{s-a}$
$\cos(\omega t)$	$\frac{s}{s^2+\omega^2}$
$\sin(\omega t)$	$\frac{\omega}{s^2+\omega^2}$
$\delta(t-a)$	e^{-as}
$u(t-a)$	$\frac{e^{-as}}{s}$

Formula	Name
$\mathcal{L}(e^{at}f(t)) = F(s-a)$	First Shifting Th.
$\mathcal{L}(f') = sF(s) - f(0)$	Differentiation
$\mathcal{L}(f(t-a)u(t-a)) = e^{-as}F(s)$	Second Shifting Th.
$\mathcal{L}(tf(t)) = -F'(s)$	Differentiation of F