Fourier Transforms

$$\mathscr{F}[f(x)] = \frac{1}{2\pi}\int_{-\infty}^{\infty} e^{-i\omega x} f(x)\,dx$$

$$\mathscr{F}_s[f(x)] = \frac{2}{\pi}\int_0^{\infty} \sin(\omega x) f(x)\,dx \qquad \mathscr{F}_c[f(x)] = \frac{2}{\pi}\int_0^{\infty} \cos(\omega x) f(x)\,dx$$

$$\mathscr{F}_s^{-1}[F(\omega)] = \int_0^{\infty} \sin(\omega x) F(\omega)\,dx \qquad \mathscr{F}_c^{-1}[F(\omega)] = \int_0^{\infty} \cos(\omega x) F(\omega)\,dx$$

$f(x)$	$\mathscr{F}[f(x)]$	$\mathscr{F}_s[f(x)]$	$\mathscr{F}_c[f(x)]$
$u_x(x,t)$		$-\omega\mathscr{F}_c[u(x,t)]$	$-\frac{2}{\pi}u(0,t) + \omega\mathscr{F}_s[u(x,t)]$
$u_{xx}(x,t)$		$\frac{2\omega u(0,t)}{\pi} + \omega^2\mathscr{F}_s[u(x,t)]$	$-\frac{2}{\pi}u_x(0,t) - \omega^2\mathscr{F}_c[u(x,t)]$
$u_t(x,t)$		$\frac{d}{dt}\mathscr{F}_s[u(x,t)]$	$\frac{d}{dt}\mathscr{F}_c[u(x,t)]$
$u_{tt}(x,t)$		$\frac{d^2}{dt^2}\mathscr{F}_s[u(x,t)]$	$\frac{d^2}{dt^2}\mathscr{F}_c[u(x,t)]$
$e^{-a\lvert x\rvert}$	$\sqrt{\frac{2}{\pi}}\left[\frac{a}{a^2+\omega^2}\right]$		
$e^{-\frac{x^2}{2}}$	$e^{-\frac{\omega^2}{2}}$		
$\delta(x)$	1		