

Fourier Transform

$f(x)$	$F(\omega)$
$\begin{cases} 1 & \text{when } x < b \\ 0 & \text{when } x > b \end{cases}$	$\frac{2 \sin b\omega}{\omega}$
$\frac{1}{x^2 + b^2}$	$\frac{\pi e^{-b\omega}}{b}$
$\frac{x}{x^2 + b^2}$	$-i\pi e^{-b\omega}$
$f^{(n)}(ax)$	$i^n a^n F(\omega)$
$x^n f(x)$	$i^n \frac{d^n F(\omega)}{d\omega^n}$
$f(bx)e^{ikx}$	$\frac{1}{b} F\left(\frac{\omega - k}{b}\right)$

Fourier Cosine Transform

$f(x)$	$F(\omega)$
$\begin{cases} 1 & \text{when } 0 < x < b \\ 0 & \text{when } x > b \end{cases}$	$\frac{\sin b\omega}{\omega}$
$\frac{1}{x^2 + b^2}$	$\frac{\pi e^{-b\omega}}{2b}$
e^{-bx}	$\frac{b}{\omega^2 + b^2}$

$x^{n-1}e^{-bx}$	$\frac{\Gamma(n)\cos\left(n\tan^{-1}\omega/b\right)}{\left(\omega^2+b^2\right)^{n/2}}$
e^{-bx^2}	$\frac{1}{2}\sqrt{\frac{\pi}{b}}e^{-\omega^2/4b}$
$\frac{e^{-b\sqrt{x}}}{\sqrt{x}}$	$\sqrt{\frac{\pi}{2\omega}}\left\{\cos\left(2b\sqrt{\omega}\right)-\sin\left(2b\sqrt{\omega}\right)\right\}$
x^{-n}	$\frac{\pi\omega^{n-1}\sec\left(n\pi/2\right)}{2\Gamma(n)}$, when $0 < n < 1$
$x^{-1/2}$	$\sqrt{\frac{\pi}{2\omega}}$
$\ln\left(\frac{x^2+b^2}{x^2+c^2}\right)$	$\frac{e^{-c\omega}e^{-b\omega}}{\pi\omega}$
$\frac{\sin bx}{x}$	$\begin{cases} \pi/2 & \text{when } \omega < b \\ \pi/4 & \text{when } \omega = b \\ 0 & \text{when } \omega > b \end{cases}$
$\sin bx^2$	$\sqrt{\frac{\pi}{8b}}\left(\cos\frac{\omega^2}{4b}-\sin\frac{\omega^2}{4b}\right)$
$\cos bx^2$	$\sqrt{\frac{\pi}{8b}}\left(\cos\frac{\omega^2}{4b}+\sin\frac{\omega^2}{4b}\right)$
$\operatorname{sech} bx$	$\frac{\pi}{2b}\operatorname{sech}^2\frac{\pi\omega}{2b}$
$\frac{\cosh\left(\sqrt{\pi}x/2\right)}{\cosh\left(\sqrt{\pi}x\right)}$	$\frac{\sqrt{\pi}}{2\omega}\frac{\cosh\left(\sqrt{\pi}\omega/2\right)}{\cosh\left(\sqrt{\pi}\omega\right)}$

Fourier Sine Transform

$f(x)$	$F(\omega)$
$\begin{cases} 1 & \text{when } 0 < x < b \\ 0 & \text{when } x > b \end{cases}$	$\frac{1 - \cos b\omega}{\omega}$
x^{-1}	$\frac{\pi}{2}$
$\frac{x}{x^2 + b^2}$	$\frac{\pi}{2} e^{-b\omega}$
e^{-bx}	$\frac{\omega}{\omega^2 + b^2}$
$\frac{1}{e^{2x} - 1}$	$\frac{\pi}{4} \coth\left(\frac{\pi\omega}{2}\right) - \frac{1}{2\omega}$
xe^{-bx^2}	$\frac{\sqrt{b}}{4b^{3/2}} \omega e^{-\omega^2/4b}$
$x^{n-1} e^{-bx}$	$\frac{\Gamma(n) \sin\left(n \tan^{-1} \omega/b\right)}{\left(\omega^2 + b^2\right)^{n/2}}$
x^{-n}	$\frac{\pi \omega^{n-1} \csc(n\pi/2)}{2\Gamma(n)} \quad \text{when } 0 < n < 2$
$x^{-1/2}$	$\sqrt{\frac{\pi}{2\omega}}$
$\frac{\sin bx}{x}$	$\frac{1}{2} \ln\left(\frac{\omega + b}{\omega - b}\right)$
$\frac{\sin bx}{x^2}$	$\begin{cases} \pi\omega/2 & \text{when } \omega < b \\ \pi b/2 & \text{when } \omega > b \end{cases}$

$\frac{\cos bx}{x}$	$\begin{cases} 0 & \text{when } a < b \\ \pi/4 & \text{when } a = b \\ \pi/2 & \text{when } a > b \end{cases}$
$\csc bx$	$\frac{\pi}{2b} \tanh \frac{\pi a}{2b}$
$\tan^{-1}(x/b)$	$\frac{\pi}{2a} e^{-ba}$