Sa (x) = sin(x) / x
sinc function

Table of Fourier Transform Pairs

Function, f(t)	**Fourier Transform, F(ω)**
Definition of Inverse Fourier Transform $f(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} F(\omega)e^{j\omega t}d\omega$	***Definition of Fourier Transform*** $F(\omega) = \int_{-\infty}^{\infty} f(t)e^{-j\omega t}dt$
$f(t-t_0)$	$F(\omega)e^{-j\omega t_0}$
$f(t)e^{j\omega_0 t}$	$F(\omega-\omega_0)$
$f(\alpha t)$	$\frac{1}{\lvert\alpha\rvert}F(\frac{\omega}{\alpha})$
$F(t)$	$2\pi f(-\omega)$
$\frac{d^n f(t)}{dt^n}$	$(j\omega)^n F(\omega)$
$(-jt)^n f(t)$	$\frac{d^n F(\omega)}{d\omega^n}$
$\int_{-\infty}^{t} f(\tau)d\tau$	$\frac{F(\omega)}{j\omega} + \pi F(0)\delta(\omega)$
$\delta(t)$	1
$e^{j\omega_0 t}$	$2\pi\delta(\omega-\omega_0)$
sgn *(t)*	$\frac{2}{j\omega}$

$j\dfrac{1}{\pi t}$	$\mathrm{sgn}(\omega)$
$u(t)$	$\pi\delta(\omega)+\dfrac{1}{j\omega}$
$\sum_{n=-\infty}^{\infty}F_n e^{jn\omega_0 t}$	$2\pi\sum_{n=-\infty}^{\infty}F_n\delta(\omega-n\omega_0)$
$rect(\dfrac{t}{\tau})$	$\tau Sa(\dfrac{\omega\tau}{2})$
$\dfrac{B}{2\pi}Sa(\dfrac{Bt}{2})$ Sa (x) = sin(x) / x sinc function	$rect(\dfrac{\omega}{B})$
$tri(t)$ tri(t) = (1-ltl)rect(t/2) triangle function = rect(t)*rect(t)	$Sa^2(\dfrac{\omega}{2})$ Sa (x) = sin(x) / x sinc function
$A\cos(\dfrac{\pi t}{2\tau})rect(\dfrac{t}{2\tau})$	$\dfrac{A\pi}{\tau}\dfrac{\cos(\omega\tau)}{(\pi/2\tau)^2-\omega^2}$
$\cos(\omega_0 t)$	$\pi[\delta(\omega-\omega_0)+\delta(\omega+\omega_0)]$
$\sin(\omega_0 t)$	$\dfrac{\pi}{j}[\delta(\omega-\omega_0)-\delta(\omega+\omega_0)]$
$u(t)\cos(\omega_0 t)$	$\dfrac{\pi}{2}[\delta(\omega-\omega_0)+\delta(\omega+\omega_0)]+\dfrac{j\omega}{\omega_0^2-\omega^2}$
$u(t)\sin(\omega_0 t)$	$\dfrac{\pi}{2j}[\delta(\omega-\omega_0)-\delta(\omega+\omega_0)]+\dfrac{\omega^2}{\omega_0^2-\omega^2}$
$u(t)e^{-\alpha t}\cos(\omega_0 t)$	$\dfrac{(\alpha+j\omega)}{\omega_0^2+(\alpha+j\omega)^2}$

$u(t)e^{-\alpha t}\sin(\omega_0 t)$	$\dfrac{\omega_0}{\omega_0^2+(\alpha+j\omega)^2}$
$e^{-\alpha\lvert t\rvert}$	$\dfrac{2\alpha}{\alpha^2+\omega^2}$
$e^{-t^2/(2\sigma^2)}$	$\sigma\sqrt{2\pi}\, e^{-\sigma^2\omega^2/2}$
$u(t)e^{-\alpha t}$	$\dfrac{1}{\alpha+j\omega}$
$u(t)te^{-\alpha t}$	$\dfrac{1}{(\alpha+j\omega)^2}$

- ***Trigonometric Fourier Series***

$$f(t)=a_0+\sum_{n=1}^{\infty}\left(a_n\cos(\omega_0 nt)+b_n\sin(\omega_0 nt)\right)$$

where

$$a_0=\frac{1}{T}\int_0^T f(t)dt \quad , \quad a_n=\frac{2}{T}\int_0^T f(t)\cos(\omega_0 nt)dt \quad \text{,and}$$

$$b_n=\frac{2}{T}\int_0^T f(t)\sin(\omega_0 nt)dt$$

- ***Complex Exponential Fourier Series***

$$f(t)=\sum_{n=-\infty}^{\infty}F_n e^{j\omega nt} \quad \text{, where} \qquad F_n=\frac{1}{T}\int_0^T f(t)e^{-j\omega_0 nt}dt$$