

Time Domain ($x(t)$)	Frequency Domain ($X(j\omega)$)
$\delta(t)$	1
1	$2\pi \delta(\omega)$
$\delta(t - t_0)$	$e^{-j\omega t_0}$
$e^{j\omega_0 t}$	$2\pi \delta(\omega - \omega_0)$
$\cos(\omega_0 t)$	$\pi \delta(\omega - \omega_0) + \pi \delta(\omega + \omega_0)$
$\sin(\omega_0 t)$	$\frac{\pi}{j} \delta(\omega - \omega_0) - \frac{\pi}{j} \delta(\omega + \omega_0)$
$\Pi\left(\frac{t}{T}\right) = \begin{cases} 1, & t \leq \frac{T}{2} \\ 0, & t > \frac{T}{2} \end{cases}$	$T \operatorname{sinc}\left(\frac{\omega T}{2\pi}\right)$
$\operatorname{sinc}\left(\frac{t}{T}\right)$	$T \Pi\left(\frac{\omega T}{2\pi}\right)$
$\Lambda\left(\frac{t}{T}\right) = \begin{cases} 1 - \frac{ t }{T}, & t \leq T \\ 0, & t > T \end{cases}$	$T \operatorname{sinc}^2\left(\frac{\omega T}{2\pi}\right)$
$\operatorname{sinc}^2\left(\frac{t}{T}\right)$	$T \Lambda\left(\frac{\omega T}{2\pi}\right)$
$u(t) = \begin{cases} 0 & t < 0 \\ 1 & t \geq 0 \end{cases}$	$\frac{1}{j\omega} + \pi \delta(\omega)$
$\frac{1}{2}\delta(t) + j\frac{1}{2\pi t}$	$u(\omega)$
$e^{-\alpha t} u(t), \alpha > 0$	$\frac{1}{\alpha + j\omega}$
$t e^{-\alpha t} u(t), \alpha > 0$	$\frac{1}{(\alpha + j\omega)^2}$
$\frac{t^{n-1}}{(n-1)!} e^{-\alpha t} u(t), \alpha > 0$	$\frac{1}{(\alpha + j\omega)^n}$
$e^{-\alpha t }$	$\frac{2\alpha}{\alpha^2 + \omega^2}$
$e^{-\pi t^2}$	$e^{-\pi f^2} = e^{-\frac{\omega^2}{4\pi}}$
$\operatorname{sgn}(t) = \begin{cases} 1, & t > 0 \\ -1, & t < 0 \\ 0, & t = 0 \end{cases}$	$\frac{2}{j\omega}$
$\delta'(t)$	$j\omega$
$\delta^{(n)}(t)$	$(j\omega)^n$
$\frac{1}{t}$	$-j\pi \operatorname{sgn}(\omega)$
$\sum_{n=-\infty}^{\infty} \delta(t - nT)$	$\frac{2\pi}{T} \sum_{k=-\infty}^{\infty} \delta\left(\omega - \frac{2\pi k}{T}\right)$

Table 1: Table with Fourier Transforms (in $j\omega$).

Time Domain ($x(t)$) Frecuency Domain ($X(j\omega)$)

$a x(t) + b y(t)$	$a X(j\omega) + b Y(j\omega)$
$x(t - t_0)$	$e^{-j\omega t_0} X(j\omega)$
$e^{j\omega_0 t} x(t)$	$X(j\omega - j\omega_0)$
$x^*(t)$	$X^*(-j\omega)$
$x(-t)$	$X(-j\omega)$
$x(a t)$	$\frac{1}{ a } X\left(j\frac{\omega}{a}\right)$
$x(t) * y(t)$	$X(j\omega) Y(j\omega)$
$x(t) y(t)$	$\frac{1}{2\pi} X(j\omega) * Y(j\omega)$
$\frac{d}{dt} x(t)$	$j\omega X(j\omega)$
$\int_{-\infty}^t x(t) dt$	$\frac{1}{j\omega} X(j\omega) + \pi X(0) \delta(\omega)$
$t x(t)$	$j \frac{d}{d\omega} X(j\omega)$
$x(t)$ real	$X(j\omega) = X^*(-j\omega)$
$x(t)$ real and even	$X(j\omega)$ real and even
$x(t)$ real and odd	$X(j\omega)$ imaginary and odd

Parseval relationship

$$\int_{-\infty}^{\infty} |x(t)|^2 dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} |X(j\omega)|^2 d\omega$$

Duality Property

$$f(u) = \int_{-\infty}^{\infty} g(v) e^{-juv} dv$$

$$g(t) \xleftrightarrow{FT} f(j\omega)$$

$$f(t) \xleftrightarrow{FT} 2\pi g(-j\omega)$$

Table 2: Table with properties of the Fourier Transform.

x	$Q(x)$	x	$Q(x)$	x	$Q(x)$	x	$Q(x)$
0.00	5.00000×10^{-1}	2.05	2.01822×10^{-2}	4.10	2.06575×10^{-5}	6.15	3.87415×10^{-10}
0.05	4.80061×10^{-1}	2.10	1.78644×10^{-2}	4.15	1.66238×10^{-5}	6.20	2.82316×10^{-10}
0.10	4.60172×10^{-1}	2.15	1.57776×10^{-2}	4.20	1.33457×10^{-5}	6.25	2.05226×10^{-10}
0.15	4.40382×10^{-1}	2.20	1.39034×10^{-2}	4.25	1.06885×10^{-5}	6.30	1.48823×10^{-10}
0.20	4.20740×10^{-1}	2.25	1.22245×10^{-2}	4.30	8.53991×10^{-6}	6.35	1.07657×10^{-10}
0.25	4.01294×10^{-1}	2.30	1.07241×10^{-2}	4.35	6.80688×10^{-6}	6.40	7.76885×10^{-11}
0.30	3.82089×10^{-1}	2.35	9.38671×10^{-3}	4.40	5.41254×10^{-6}	6.45	5.59251×10^{-11}
0.35	3.63169×10^{-1}	2.40	8.19754×10^{-3}	4.45	4.29351×10^{-6}	6.50	4.01600×10^{-11}
0.40	3.44578×10^{-1}	2.45	7.14281×10^{-3}	4.50	3.39767×10^{-6}	6.55	2.87685×10^{-11}
0.45	3.26355×10^{-1}	2.50	6.20967×10^{-3}	4.55	2.68230×10^{-6}	6.60	2.05579×10^{-11}
0.50	3.08538×10^{-1}	2.55	5.38615×10^{-3}	4.60	2.11245×10^{-6}	6.65	1.46547×10^{-11}
0.55	2.91160×10^{-1}	2.60	4.66119×10^{-3}	4.65	1.65968×10^{-6}	6.70	1.04210×10^{-11}
0.60	2.74253×10^{-1}	2.65	4.02459×10^{-3}	4.70	1.30081×10^{-6}	6.75	7.39226×10^{-12}
0.65	2.57846×10^{-1}	2.70	3.46697×10^{-3}	4.75	1.01708×10^{-6}	6.80	5.23096×10^{-12}
0.70	2.41964×10^{-1}	2.75	2.97976×10^{-3}	4.80	7.93328×10^{-7}	6.85	3.69250×10^{-12}
0.75	2.26627×10^{-1}	2.80	2.55513×10^{-3}	4.85	6.17307×10^{-7}	6.90	2.60013×10^{-12}
0.80	2.11855×10^{-1}	2.85	2.18596×10^{-3}	4.90	4.79183×10^{-7}	6.95	1.82643×10^{-12}
0.85	1.97663×10^{-1}	2.90	1.86581×10^{-3}	4.95	3.71067×10^{-7}	7.00	1.27981×10^{-12}
0.90	1.84060×10^{-1}	2.95	1.58887×10^{-3}	5.00	2.86652×10^{-7}	7.05	8.94589×10^{-13}
0.95	1.71056×10^{-1}	3.00	1.34990×10^{-3}	5.05	2.20905×10^{-7}	7.10	6.23784×10^{-13}
1.00	1.58655×10^{-1}	3.05	1.14421×10^{-3}	5.10	1.69827×10^{-7}	7.15	4.33890×10^{-13}
1.05	1.46859×10^{-1}	3.10	9.67603×10^{-4}	5.15	1.30243×10^{-7}	7.20	3.01063×10^{-13}
1.10	1.35666×10^{-1}	3.15	8.16352×10^{-4}	5.20	9.96443×10^{-8}	7.25	2.08386×10^{-13}
1.15	1.25072×10^{-1}	3.20	6.87138×10^{-4}	5.25	7.60496×10^{-8}	7.30	1.43884×10^{-13}
1.20	1.15070×10^{-1}	3.25	5.77025×10^{-4}	5.30	5.79013×10^{-8}	7.35	9.91034×10^{-14}
1.25	1.05650×10^{-1}	3.30	4.83424×10^{-4}	5.35	4.39771×10^{-8}	7.40	6.80922×10^{-14}
1.30	9.68005×10^{-2}	3.35	4.04058×10^{-4}	5.40	3.33204×10^{-8}	7.45	4.66701×10^{-14}
1.35	8.85080×10^{-2}	3.40	3.36929×10^{-4}	5.45	2.51849×10^{-8}	7.50	3.19089×10^{-14}
1.40	8.07567×10^{-2}	3.45	2.80293×10^{-4}	5.50	1.89896×10^{-8}	7.55	2.17629×10^{-14}
1.45	7.35293×10^{-2}	3.50	2.32629×10^{-4}	5.55	1.42835×10^{-8}	7.60	1.48065×10^{-14}
1.50	6.68072×10^{-2}	3.55	1.92616×10^{-4}	5.60	1.07176×10^{-8}	7.65	1.00490×10^{-14}
1.55	6.05708×10^{-2}	3.60	1.59109×10^{-4}	5.65	8.02239×10^{-9}	7.70	6.80331×10^{-15}
1.60	5.47993×10^{-2}	3.65	1.31120×10^{-4}	5.70	5.99037×10^{-9}	7.75	4.59463×10^{-15}
1.65	4.94715×10^{-2}	3.70	1.07800×10^{-4}	5.75	4.46217×10^{-9}	7.80	3.09536×10^{-15}
1.70	4.45655×10^{-2}	3.75	8.84173×10^{-5}	5.80	3.31575×10^{-9}	7.85	2.08019×10^{-15}
1.75	4.00592×10^{-2}	3.80	7.23480×10^{-5}	5.85	2.45787×10^{-9}	7.90	1.39452×10^{-15}
1.80	3.59303×10^{-2}	3.85	5.90589×10^{-5}	5.90	1.81751×10^{-9}	7.95	9.32558×10^{-16}
1.85	3.21568×10^{-2}	3.90	4.80963×10^{-5}	5.95	1.34071×10^{-9}	8.00	6.22096×10^{-16}
1.90	2.87166×10^{-2}	3.95	3.90756×10^{-5}	6.00	9.86588×10^{-10}		
1.95	2.55881×10^{-2}	4.00	3.16712×10^{-5}	6.05	7.24229×10^{-10}		
2.00	2.27501×10^{-2}	4.05	2.56088×10^{-5}	6.10	5.30342×10^{-10}		

Table 3: Funtion $Q(x)$.

TRIGONOMETRIC IDENTITIES

$$\begin{aligned} \sin^2(a) + \cos^2(a) &= 1 \\ \tan^2(a) + 1 &= \sec^2(a), \quad \cot^2(a) + 1 = \csc^2(a) \\ \cos(a) \cos(b) &= \frac{1}{2} \cos(a - b) + \frac{1}{2} \cos(a + b) \\ \sin(a) \sin(b) &= \frac{1}{2} \cos(a - b) - \frac{1}{2} \cos(a + b) \\ \cos(a) \sin(b) &= \frac{1}{2} \sin(a + b) - \frac{1}{2} \sin(a - b) \\ \sin(a \pm b) &= \sin(a) \cos(b) \pm \cos(a) \sin(b) \\ \cos(a \pm b) &= \cos(a) \cos(b) \mp \sin(a) \sin(b) \\ \sin(a) + \sin(b) &= 2 \sin\left(\frac{a+b}{2}\right) \cos\left(\frac{a-b}{2}\right) \\ \cos(a) + \cos(b) &= 2 \cos\left(\frac{a+b}{2}\right) \cos\left(\frac{a-b}{2}\right) \\ \sin(a) - \sin(b) &= 2 \cos\left(\frac{a+b}{2}\right) \sin\left(\frac{a-b}{2}\right) \\ \cos(a) - \cos(b) &= -2 \sin\left(\frac{a+b}{2}\right) \sin\left(\frac{a-b}{2}\right) \\ \sin^2(a) - \sin^2(b) &= \sin(a+b) \sin(a-b) \\ \cos^2(a) - \sin^2(b) &= \cos(a+b) \cos(a-b) \\ \cos(a) &= \frac{e^{+ja} + e^{-ja}}{2}, \quad \sin(a) = \frac{e^{+ja} - e^{-ja}}{2j} \\ e^{ja} &= \cos(a) + j \sin(a) \end{aligned}$$

SOME INTEGRALS OF TRIGONOMETRIC FUNCTIONS

$$\begin{aligned} \int \cos(a t) dt &= \frac{1}{a} \sin(a t), \quad \int \sin(a t) dt = -\frac{1}{a} \cos(a t) \\ \int \cos^2(a t) dt &= \frac{t}{2} + \frac{1}{2a} \cos(a t) \sin(a t) = \frac{t}{2} + \frac{1}{4a} \sin(2a t) \\ \int \sin^2(a t) dt &= \frac{t}{2} - \frac{1}{2a} \cos(a t) \sin(a t) = \frac{t}{2} - \frac{1}{4a} \sin(2a t) \\ \int \cos(a t) \cos(b t) dt &= \frac{1}{2} \frac{\sin((a-b)t)}{a-b} + \frac{1}{2} \frac{\sin((a+b)t)}{a+b} \\ \int \sin(a t) \sin(b t) dt &= \frac{1}{2} \frac{\sin((a-b)t)}{a-b} - \frac{1}{2} \frac{\sin((a+b)t)}{a+b} \\ \int \cos(a t) \sin(b t) dt &= \frac{1}{2} \frac{\cos((a-b)t)}{a-b} - \frac{1}{2} \frac{\cos((a+b)t)}{a+b} \end{aligned}$$

SOME DEFINITE INTEGRALS

For $a > 0, b > 0$ and $|a| \geq |b|$, and integer n

$$\begin{aligned} \int_{-\pi}^{\pi} \frac{1}{a \pm b \cos(n \omega)} d\omega &= \frac{2\pi}{\sqrt{a^2 - b^2}}, \quad \int_{-\pi}^{\pi} \frac{1}{(a \pm b \cos(n \omega))^2} d\omega = \frac{2\pi a}{\sqrt{(a^2 - b^2)^3}} \\ \int_{-\pi}^{\pi} \frac{1}{a \pm b \sin(n \omega)} d\omega &= \frac{2\pi}{\sqrt{a^2 - b^2}}, \quad \int_{-\pi}^{\pi} \frac{1}{(a \pm b \sin(n \omega))^2} d\omega = \frac{2\pi a}{\sqrt{(a^2 - b^2)^3}} \end{aligned}$$

Table 4: Table with trigonometric identities and integrals of trigonometric functions.