

Common

$$\begin{aligned}\operatorname{sinc} \theta &= \frac{\sin \pi \theta}{\pi \theta} \\ \int e^{at} dt &= \frac{1}{a} e^{at} + C \\ \int t e^{at} dt &= \frac{at-1}{t^2} e^{at} + C \\ \int t^n e^{at} dt &= \frac{t^n}{a} e^{at} - \frac{n}{a} \int t^{n-1} e^{at} dt \\ \int e^{at} \sin bt dt &= \frac{1}{a^2 + b^2} e^{at} (a \sin bt - b \cos bt) + C \\ \int e^{at} \cos bt dt &= \frac{1}{a^2 + b^2} e^{at} (b \sin bt + a \cos bt) + C\end{aligned}$$

Chapter 3

Continuous

$$\begin{aligned}x(t) &= \sum_{k=-\infty}^{+\infty} a_k e^{jk\omega_0 t} = \sum_{k=-\infty}^{+\infty} a_k e^{jk(2\pi/T)t} \\ a_k &= \frac{1}{T} \int_T x(t) e^{-jk\omega_0 t} dt = \frac{1}{T} \int_T x(t) e^{-j(2\pi/T)t} dt \\ a_0 &= \frac{1}{T} \int_T x(t) dt\end{aligned}$$

Convergent

$$\int_T |x(t)| dt < \infty$$

Discrete

$$\begin{aligned}x[n] &= \sum_{k=\langle N \rangle} a_k e^{jk\omega_0 n} = \sum_{k=\langle N \rangle} a_k e^{jk(2\pi/N)n} \\ a_k &= \frac{1}{N} \sum_{k=\langle N \rangle} x[n] e^{-jk\omega_0 n} = \frac{1}{N} \sum_{k=\langle N \rangle} x[n] e^{-jk(2\pi/N)n}\end{aligned}$$

Chapter 4

Continuous

$$\begin{aligned}x(t) &= \frac{1}{2\pi} \int_{-\infty}^{+\infty} X(j\omega) e^{j\omega t} d\omega \\ X(j\omega) &= \int_{-\infty}^{+\infty} x(t) e^{-j\omega t} dt\end{aligned}$$

Periodic

$$\begin{aligned}x(t) &= \sum_{k=-\infty}^{+\infty} a_k e^{jk\omega_0 t} \\ X(j\omega) &= \sum_{k=-\infty}^{+\infty} 2\pi a_k \delta(\omega - k\omega_0)\end{aligned}$$

Differential Equations

$$\begin{aligned}\frac{d^2 y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y(t) &= \frac{dx(t)}{dt} + 2x(t) \\ H(j\omega) &= \frac{(j\omega) + 2}{(j\omega)^2 + 4(j\omega) + 3} = \frac{1/2}{j\omega + 1} + \frac{1/2}{j\omega + 3} \\ h(t) &= \frac{1}{2} e^{-t} u(t) + \frac{1}{2} e^{-3t} u(t)\end{aligned}$$

Chapter 5

Discrete

$$\begin{aligned}x[n] &= \frac{1}{2\pi} \int_{2\pi} X(e^{j\omega} e^{j\omega n}) d\omega \\ X(e^{j\omega}) &= \sum_{n=-\infty}^{\infty} x[n] e^{-j\omega n}\end{aligned}$$

Periodic

$$\begin{aligned}x[n] &= \sum_{k=\langle N \rangle} a_k e^{jk(2\pi/N)n} \\ X(e^{j\omega}) &= \sum_{k=-\infty}^{\infty} 2\pi a_k \delta\left(\omega - \frac{2\pi k}{N}\right)\end{aligned}$$

Differential Equations

$$\begin{aligned}y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] &= 2x[n] \\ H(e^{j\omega}) &= \frac{2}{1 - \frac{3}{4}e^{-j\omega} + \frac{1}{8}e^{-j2\omega}} = \frac{4}{1 - \frac{1}{2}e^{-j\omega}} - \frac{2}{1 - \frac{1}{4}e^{-j\omega}} \\ h[n] &= 4\left(\frac{1}{2}\right)^n u[n] - 2\left(\frac{1}{4}\right)^n u[n]\end{aligned}$$

Chapter 6

Group Delay

$$\tau(\omega) = -\frac{d}{d\omega} \{\angle H_2(j\omega)\}$$

Step response

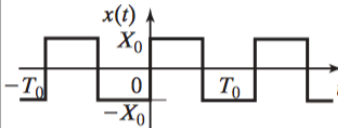
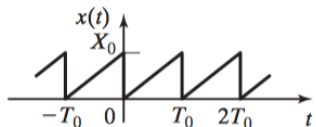
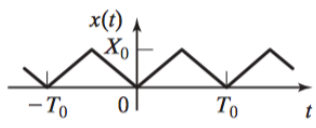
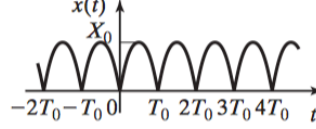
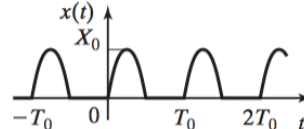
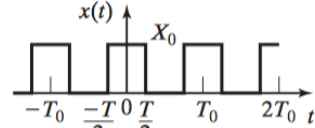
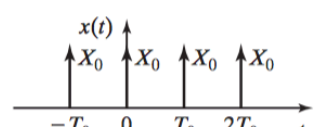
$$\begin{aligned}s(t) &= \int_{-\infty}^t h(\tau) d\tau \\ s[n] &= \sum_{m=-\infty}^n h[m] \\ \tau \frac{dy(t)}{dt} + y(t) &= x(t) \\ H(j\omega) &= \frac{1}{j\omega\tau + 1} \\ h(t) &= \frac{1}{\tau} e^{-t/\tau} u(t) \\ s(t) &= h(t) * u(t) = [1 - e^{-t/\tau}] u(t)\end{aligned}$$

First Order Systems

Second Order Systems

$$\begin{aligned}\frac{d^2 y(t)}{dt^2} + 2\xi\omega_n^2 \frac{dy(t)}{dt} + \omega_n^2 y(t) &= \omega_n^2 x(t) \\ \text{For } \xi \neq 1, \\ H(j\omega) &= \frac{M}{j\omega - c_1} - \frac{M}{j\omega - c_2} \\ c_{1,2} &= -\xi\omega_n \pm \omega_n \sqrt{\xi^2 - 1}, M = \frac{\omega_n}{2\sqrt{\xi^2 - 1}} \\ h(t) &= M[e^{c_1 t} - e^{c_2 t}] u(t) \\ s(t) &= h(t) * u(t) = \left\{ 1 + M \left[\frac{e^{c_1 t}}{c_1} - \frac{e^{c_2 t}}{c_2} \right] \right\} u(t) \\ \text{For } \xi = 1, \\ H(j\omega) &= \frac{\omega_n^2}{(j\omega + \omega_n)^2} \\ h(t) &= \omega_n^2 t e^{-\omega_n t} u(t) \\ s(t) &= [1 - e^{-\omega_n t} - \omega_n t e^{-\omega_n t}] u(t) \\ \text{For } 0 < \xi < 1, \\ H(j\omega) &= \frac{1}{(j\omega/\omega_n)^2 + 2\xi(j\omega/\omega_n) + 1} \\ h(t) &= \frac{\omega_n e^{-\xi\omega_n t}}{\sqrt{1 - \xi^2}} [\sin(\omega_n \sqrt{1 - \xi^2} t)] u(t) \\ 0 < \xi < 1 &\quad \text{under damped} \\ \xi = 1 &\quad \text{critical damped} \\ \xi > 1 &\quad \text{over damped}\end{aligned}$$

$$\begin{aligned}\omega_{max} &= \omega_n \sqrt{1 - 2\xi^2} \\ |H(j\omega_{max})| &= \frac{1}{2\xi \sqrt{1 - \xi^2}}\end{aligned}$$

Name	Waveform	C_0	$C_k, k \neq 0$	Comments
1. Square wave		0	$-j \frac{2X_0}{\pi k}$	$C_k = 0, k \text{ even}$
2. Sawtooth		$\frac{X_0}{2}$	$j \frac{X_0}{2\pi k}$	
3. Triangular wave		$\frac{X_0}{2}$	$\frac{-2X_0}{(\pi k)^2}$	$C_k = 0, k \text{ even}$
4. Full-wave rectified		$\frac{2X_0}{\pi}$	$\frac{-2X_0}{\pi(4k^2 - 1)}$	
5. Half-wave rectified		$\frac{X_0}{\pi}$	$\frac{-X_0}{\pi(k^2 - 1)}$	$C_k = 0, k \text{ odd, except}$ $C_1 = -j \frac{X_0}{4}$ and $C_{-1} = j \frac{X_0}{4}$
6. Rectangular wave		$\frac{TX_0}{T_0}$	$\frac{TX_0}{T_0} \text{sinc} \frac{Tk\omega_0}{2}$	$\frac{Tk\omega_0}{2} = \frac{\pi Tk}{T_0}$
7. Impulse train		$\frac{X_0}{T_0}$	$\frac{X_0}{T_0}$	

Factor	Magnitude	Phase
K	$20 \log_{10} K$	0°
$(j\omega)^N$	$20N \text{ dB/decade}$	$90N^\circ$
$\frac{1}{(j\omega)^N}$	$-20N \text{ dB/decade}$	$-90N^\circ$
$\left(1 + \frac{j\omega}{z}\right)^N$	$20N \text{ dB/decade}$	0° to $90N^\circ$
$\frac{1}{(1 + j\omega/p)^N}$	$-20N \text{ dB/decade}$	0° to $-90N^\circ$
$\left[1 + \frac{2j\omega\zeta}{\omega_n} + \left(\frac{j\omega}{\omega_n}\right)^2\right]^N$	$40N \text{ dB/decade}$	0° to $180N^\circ$
$\frac{1}{[1 + 2j\omega\zeta/\omega_k + (j\omega/\omega_k)^2]^N}$	$-40N \text{ dB/decade}$	0° to $-180N^\circ$

Property	Aperiodic Signal	Fourier transform	Aperiodic Signal	Fourier transform
$\left. \begin{array}{l} x(t) \\ y(t) \end{array} \right\}$ Period with period T and fundamental frequency $\omega_0 = 2\pi/T$		a_k b_k	$\left. \begin{array}{l} x[n] \\ y[n] \end{array} \right\}$ Period with period N and fundamental frequency $\omega_0 = 2\pi/N$	$\left. \begin{array}{l} X(e^{j\omega}) \\ Y(e^{j\omega}) \end{array} \right\}$ periodic with period N
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Linearity	$Ax(t) + By(t)$	$Aa_k + Bb_k$	$Ax[n] + By[n]$	$Aa_k + Bb_k$
Time Shifting	$x(t - t_0)$	$a_k e^{-jk\omega_0 t_0} = a_k e^{-jk(2\pi/T)t_0}$	$x[n - n_0]$	$a_k e^{-jk(2\pi/N)n_0}$
Frequency Shifting	$e^{-jM\omega_0 t} = e^{-jM(2\pi/T)t} x(t)$	a_{k-M}	$e^{-jM(2\pi/N)t} x[n]$	a_{k-M}
Conjugation	$x^*(t)$	a_{-k}^*	$x^*[n]$	a_{-k}^*
Time Reversal	$x(-t)$	a_{-k}	$x[-n]$	a_{-k}
Time and Frequency Scaling / Time expansion	$x(\alpha t), \alpha > 0$	a_{-k}	$x_m[n] = \begin{cases} x[n/m] & \text{if } n = \text{multiple of } m \\ 0 & \text{if } n \neq \text{multiple of } m \end{cases}$	$\frac{1}{m} a_k$
Periodic Convolution	$\int_T x(\tau)y(t - \tau)d\tau$	$Ta_k b_k$	$\sum_{r=<N>} x[r]y[n - r]$	$Na_k b_k$
Multiplication	$x(t)y(t)$	$\sum_{l=-\infty}^{+\infty} a_l b_{k-l}$	$x[n]y[n]$	$\sum_{l=<N>} a_l b_{k-l}$
Differentiation	$\frac{d}{dt} x(t)$	$jk\omega_0 a_k = jk \frac{2\pi}{T} a_k$	$x[n] - x[n - 1]$	$(1 - e^{-jk(2\pi/N)})a_k$
Integration/Accumulation	$\int_{-\infty}^t x(t)dt$	$\frac{1}{jk\omega_0} a_k = \frac{1}{jk(2\pi/T)} a_k$	$\sum_{k=-\infty}^{+\infty} x[k]$	$\frac{1}{1 - e^{-jk(2\pi/N)}} a_k$
Conjugate Symmetry for Real Signals	$x(t)$ real	$\begin{cases} a_k = a_{-k}^* \\ \Re\{a_k\} = \Re\{a_{-k}\} \\ \Im\{a_k\} = -\Im\{a_{-k}\} \\ a_k = a_{-k} \\ \angle a_k = -\angle a_{-k} \end{cases}$	$x[n]$ real	$\begin{cases} a_k = a_{-k}^* \\ \Re\{a_k\} = \Re\{a_{-k}\} \\ \Im\{a_k\} = -\Im\{a_{-k}\} \\ a_k = a_{-k} \\ \angle a_k = -\angle a_{-k} \end{cases}$
Symmetry for Real and Even Signals	$x(t)$ real and even	a_k real and even	$x[n]$ real and even	a_k real and even
Symmetry for Real and Odd Signals	$x(t)$ real and odd	a_k purely imaginary and odd	$x[n]$ real and odd	a_k purely imaginary and odd
Even-Odd Decomposition for Real Signals	$x_e(t) = \mathfrak{E}\mathfrak{v}\{x(t)\}$ $[x(t)]$ real $x_o(t) = \mathfrak{O}\mathfrak{d}\{x(t)\}$ $[x(t)]$ real	$\Re\{a_k\}$ $j\Im\{a_k\}$	$x_e[n] = \mathfrak{E}\mathfrak{v}\{x[n]\}$ $[x[n]]$ real $x_o[n] = \mathfrak{O}\mathfrak{d}\{x[n]\}$ $[x[n]]$ real	$\Re\{a_k\}$ $j\Im\{a_k\}$
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Parseval's Relation for Aperiodic Signals	$\frac{1}{T} \int_T x(t) ^2 dt = \sum_{k=-\infty}^{+\infty} a_k ^2$		$\frac{1}{N} \sum_N x[n] ^2 = \sum_{k=<N>} a_k ^2$	

Table 1: Properties of Fourier Series

Property	Aperiodic Signal	Fourier transform	Aperiodic Signal	Fourier transform
	$x(t)$	$X(j\omega)$	$x[n]$	$X(e^{j\omega})$ } periodic with
	$y(t)$	$Y(j\omega)$	$y[n]$	$Y(e^{j\omega})$ } period 2π
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Linearity	$ax(t) + by(t)$	$aX(j\omega) + bY(j\omega)$	$ax[n] + by[n]$	$aX(e^{j\omega}) + bY(e^{j\omega})$
Time Shifting	$x(t - t_0)$	$e^{-j\omega t_0} X(j\omega)$	$x[n - n_0]$	$e^{-j\omega n_0} X(e^{j\omega})$
Frequency Shifting	$e^{-j\omega t_0} x(t)$	$X(j(\omega - \omega_0))$	$e^{j\omega_0 n}$	$X(e^{j(\omega - \omega_0)})$
Conjugation	$x^*(t)$	$X^*(-j\omega)$	$x^*[n]$	$X^*(e^{-j\omega})$
Time Reversal	$x(-t)$	$X(-j\omega)$	$x[-n]$	$X(e^{-j\omega})$
Time and Frequency Scaling / Time expansion	$x(at)$	$\frac{1}{ a } X(\frac{j\omega}{a})$	$x_k[n] = \begin{cases} x[n/k] & \text{if } n = \text{multiple of } k \\ 0 & \text{if } n \neq \text{multiple of } k \end{cases}$	$X(e^{jk\omega})$
Convolution	$x(t) * y(t)$	$X(j\omega)Y(j\omega)$	$x[n] * y[n]$	$X(e^{j\omega})Y(e^{j\omega})$
Multiplication	$x(t)y(t)$	$\frac{1}{2\pi} \int_{-\infty}^{+\infty} X(j\omega)Y(j(\omega - \theta))d\theta$	$x[n]y[n]$	$\frac{1}{2\pi} \int_{2\pi} X(e^{j\theta})Y(e^{j(\omega - \theta)})d\theta$
Differentiation in Time	$\frac{d}{dt}x(t)$	$j\omega X(j\omega)$	$x[n] - x[n - 1]$	$(1 - e^{-j\omega})X(e^{j\omega})$
Integration/Accumulation	$\int_{-\infty}^t x(t)dt$	$\frac{1}{j\omega} X(j\omega) + \pi X(0)\delta(\omega)$	$\sum_{k=-\infty}^{+\infty} x[k]$	$\frac{1}{1 - e^{-j\omega}} X(e^{j\omega})$
Differentiation in Frequency	$tx(t)$	$j \frac{d}{d\omega} X(j\omega)$	$nx[n]$	$j \frac{dX(e^{j\omega})}{d\omega}$
Conjugate Symmetry for Real Signals	$x(t)$ real	$\begin{cases} X(j\omega) = X^*(-j\omega) \\ \Re\{X(j\omega)\} = \Re\{X(-j\omega)\} \\ \Im\{X(j\omega)\} = -\Im\{X(-j\omega)\} \\ X(j\omega) = X(-j\omega) \\ \angle X(j\omega) = -\angle X(-j\omega) \end{cases}$	$x[n]$ real	$\begin{cases} X(e^{j\omega}) = X^*(e^{-j\omega}) \\ \Re\{X(e^{j\omega})\} = \Re\{X(e^{-j\omega})\} \\ \Im\{X(e^{j\omega})\} = -\Im\{X(e^{-j\omega})\} \\ X(e^{j\omega}) = X(e^{-j\omega}) \\ \angle X(e^{j\omega}) = -\angle X(e^{-j\omega}) \end{cases}$
Symmetry for Real and Even Signals	$x(t)$ real and even	$X(j\omega)$ real and even	$x[n]$ real and even	$X(e^{j\omega})$ real and even
Symmetry for Real and Odd Signals	$x(t)$ real and odd	$X(j\omega)$ purely imaginary and odd	$x[n]$ real and odd	$X(e^{j\omega})$ purely imaginary and odd
Even-Odd Decomposition for Real Signals	$x_e(t) = \mathfrak{E}\mathfrak{v}\{x(t)\}$ $[x(t)]$ real $x_o(t) = \mathfrak{O}\mathfrak{d}\{x(t)\}$ $[x(t)]$ real	$\Re\{X(j\omega)\}$ $j\Im\{X(j\omega)\}$	$x_e[n] = \mathfrak{E}\mathfrak{v}\{x[n]\}$ $[x[n]]$ real $x_o[n] = \mathfrak{O}\mathfrak{d}\{x[n]\}$ $[x[n]]$ real	$\Re\{X(e^{j\omega})\}$ $j\Im\{X(e^{j\omega})\}$
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Parseval's Relation for Aperiodic Signals	$\int_{-\infty}^{+\infty} x(t) ^2 dt = \frac{1}{2\pi} \int_{-\infty}^{+\infty} X(j\omega) ^2 d\omega$		$\sum_{n=-\infty}^{+\infty} x[n] ^2 dt = \frac{1}{2\pi} \int_{2\pi} X(e^{j\omega}) ^2 d\omega$	

Table 2: Properties of Fourier Transform

Signal	Fourier transform	Fourier series coefficients	Signal	Fourier transform	Fourier series coefficients
$\sum_{k=-\infty}^{+\infty} a_k e^{jk\omega_0 t}$	$2\pi \sum_{k=-\infty}^{+\infty} a_k \delta(\omega - k\omega_0)$	a_k	$\sum_{k=\langle N \rangle} a_k e^{jk(2n/N)n}$	$2\pi \sum_{k=-\infty}^{+\infty} a_k \delta\left(\omega - \frac{2\pi k}{N}\right)$	a_k
$e^{j\omega_0 t}$	$2\pi \delta(\omega - k\omega_0)$	$a_1 = 1$ $a_k = 0, \text{ otherwise}$	$e^{j\omega_0 n}$	$2\pi \sum_{l=-\infty}^{+\infty} \delta(\omega - \omega_0 - 2\pi l)$	$\omega_0 = \frac{2\pi m}{N}$ $a_k = \begin{cases} 1, k = m, m \pm N, m \pm 2N, \dots \\ 0, \text{otherwise} \end{cases}$
$\cos \omega_0 t$	$\pi[\delta(\omega - k\omega_0) + \delta(\omega + k\omega_0)]$	$a_1 = a_{-1} = \frac{1}{2}$ $a_k = 0, \text{ otherwise}$	$\cos \omega_0 n$	$\pi \sum_{l=-\infty}^{+\infty} \delta(\omega - \omega_0 - 2\pi l) + \delta(\omega + \omega_0 - 2\pi l)$	$\omega_0 = \frac{2\pi m}{N}$ $a_k = \begin{cases} \frac{1}{2}, k = \pm m, \pm m \pm N, \pm m \pm 2N, \dots \\ 0, \text{otherwise} \end{cases}$
$\sin \omega_0 t$	$\frac{\pi}{j} \delta(\omega - k\omega_0) - \delta(\omega + k\omega_0)]$	$a_1 = a_{-1} = \frac{1}{2j}$ $a_k = 0, \text{ otherwise}$	$\sin \omega_0 n$	$\frac{\pi}{j} \sum_{l=-\infty}^{+\infty} \delta(\omega - \omega_0 - 2\pi l) - \delta(\omega + \omega_0 - 2\pi l)$	$\omega_0 = \frac{2\pi r}{N}$ $a_k = \begin{cases} \frac{1}{2j}, k = r, r \pm N, r \pm 2N, \dots \\ -\frac{1}{2j}, k = -r, -r \pm N, -r \pm 2N, \dots \\ 0, \text{otherwise} \end{cases}$
$x(t) = 1$	$2\pi \delta(\omega)$	$a_0 = 1$ $a_k = 0, k \neq 0$	$x[n] = 1$	$2\pi \sum_{l=-\infty}^{+\infty} \delta(\omega - 2\pi l)$	$a_k = \begin{cases} 1, & k = 0, \pm N, \pm 2N \\ 0, & \text{otherwise } k \neq 0 \end{cases}$
$x(t) = \begin{cases} 1, & t < T_1 \\ 0, & T_1 < t \leq \frac{T}{2} \end{cases}$	$\sum_{k=-\infty}^{+\infty} \frac{2 \sin k\omega_0 T_1}{k} \delta(\omega - \omega_0)$	$\frac{\sin k\omega_0 T_1}{k\pi}$	$x[n] = \begin{cases} 1, & n \leq N_1 \\ 0, & N_1 < n \leq N/2 \end{cases}$	$2\pi \sum_{k=-\infty}^{+\infty} a_k \delta\left(\omega - \frac{2\pi k}{N}\right)$	$a_k = \frac{\sin[(2\pi k/N)(N_1 + \frac{1}{2})]}{N \sin[2\pi k/2N]}, k \neq 0, \pm N, \pm 2N$
$x(t+T) = x(t)$	$\frac{2\pi}{T} \sum_{n=-\infty}^{+\infty} \delta\left(\omega - \frac{2\pi n}{T}\right)$	$a_k = \frac{1}{T} \text{ for all } k$	$x[n+N] = x[n]$	$\frac{2\pi}{N} \sum_{n=-\infty}^{+\infty} \delta\left(\omega - \frac{2\pi n}{N}\right)$	$a_k = \frac{2N_1 + 1}{N}, k = 0, \pm N, \pm 2N$
$x(t) \begin{cases} 1, & t < T_1 \\ 0, & t > T_1 \end{cases}$	$\frac{2 \sin \omega T_1}{\omega}$	—	$x[n] \begin{cases} 1, & n \leq N \\ 0, & n > N \end{cases}$	$\frac{\sin[\omega(N_1 + \frac{1}{2})]}{\sin(\omega/2)}$	—
$\frac{\sin Wt}{\pi t}$	$X(j\omega) = \begin{cases} 1, & \omega < W \\ 0, & \omega > W \end{cases}$	—	$\frac{\sin Wn}{\pi n} = \frac{W}{\pi} \text{sinc}\left(\frac{Wn}{\pi}\right)$	$X(\omega) = \begin{cases} 1, & 0 < \omega < W \\ 0, & W < \omega < \pi \end{cases}$	—
$\delta(t)$	1	—	$\delta[n]$	1	—
$u(t)$	$\frac{1}{j\omega} + \pi \delta(\omega)$	—	$u[n]$	$\frac{1}{1 - e^{-j\omega}} + \sum_{k=-\infty}^{+\infty} \pi \delta(\omega - 2\pi k)$	—
$\delta(t - t_0)$	$e^{-j\omega t_0}$	—	$\delta[n - n_0]$	$\frac{1}{e^{-j\omega n_0}}$	—
$e^{-at} u(t), \Re\{a\} > 0$	$\frac{1}{a + j\omega}$	—	$a^n u[n], a < 1$	$\frac{1}{1 - ae^{-j\omega}}$	—
$te^{-at} u(t), \Re\{a\} > 0$	$\frac{1}{(a + j\omega)^2}$	—	$(n+1)a^n u[n], a < 1$	$\frac{1}{(1 - ae^{-j\omega})^2}$	—
$\frac{t^{n-1}}{(n-1)!} e^{-at} u(t), \Re\{a\} > 0$	$\frac{1}{(a + j\omega)^n}$	—	$\frac{(n+r-1)!}{n!(r-1)!} a^n u[n], a < 1$	$\frac{1}{(1 - ae^{-j\omega})^n}$	—

Table 3: Basic Fourier Transform Pairs