TABLE I

COMMON z-TRANSFORM PAIRS

Sequence	Transform	ROC
$\delta[n]$	1	All z
$u[n]$	$\frac{1}{1-z^{-1}}$	$\|z\| > 1$
$u[-n-1]$	$\frac{1}{1-z^{-1}}$	$\|z\| < 1$
$\delta[n-m]$	z^{-m}	All z except 0 (if $m > 0$) or ∞ (if $m < 0$)
$a^n u[n]$	$\frac{1}{1-az-1}$	$\|z\| > \|a\|$
$-a^n u[-n-1]$	$\frac{1}{1-az-1}$	$\|z\| < \|a\|$
$na^n u[n]$	$\frac{az^{-1}}{(1-az^{-1})^2}$	$\|z\| > \|a\|$
$-na^n u[-n-1]$	$\frac{az^{-1}}{(1-az^{-1})^2}$	$\|z\| < \|a\|$
$[\cos\omega_0 n]u[n]$	$\frac{1-[\cos\omega_0]z^{-1}}{1-[2\cos\omega_0]z^{-1}+z^{-2}}$	$\|z\| > 1$
$[\sin\omega_0 n]u[n]$	$\frac{1-[\sin\omega_0]z^{-1}}{1-[2\cos\omega_0]z^{-1}+z^{-2}}$	$\|z\| > 1$
$[r^n\cos\omega_0 n]u[n]$	$\frac{1-[r\cos\omega_0]z^{-1}}{1-[2r\cos\omega_0]z^{-1}+r^2z^{-2}}$	$\|z\| > r$
$[r^n\sin\omega_0 n]u[n]$	$\frac{1-[r\sin\omega_0]z^{-1}}{1-[2r\cos\omega_0]z^{-1}+r^2z^{-2}}$	$\|z\| > r$
$\begin{cases} a^n, & 0 \le n \le N-1, \\ 0, & \text{otherwise} \end{cases}$	$\frac{1-a^N z^{-N}}{1-az^{-1}}$	$\|z\| > 0$

TABLE II
SOME z-TRANSFORM PROPERTIES

Sequence	Transform	ROC
$\mathbf{x}[n]$	$X(z)$	R_x
$x_1[n]$	$X_1(z)$	R_{x_1}
$x_2[n]$	$X_2(z)$	R_{x_2}
$ax_1[n] + bx_2[n]$	$aX_1(z) + bX_2(z)$	Contains $R_{x_1} \bigcap R_{x_2}$
$x[n - n_0]$	$z^{-n_0} X(z)$	R_x, except for the possible addition or deletion of the origin or ∞
$z_0^n x[n]$	$X\left(\frac{z}{z_0}\right)$	$\|z_0\| R_x$
$nx[n]$	$-z\frac{dX(z)}{dz}$	R_x, except for the possible addition or deletion of the origin or ∞
$x^*[n]$	$X^*(z^*)$	R_x
$Re\{x[n]\}$	$\frac{1}{2}\left[X(z) + X^*(z^*)\right]$	Contains R_x
$Im\{x[n]\}$	$\frac{1}{2j}\left[X(z) - X^*(z^*)\right]$	Contains R_x
$x^*[-n]$	$X^*\left(\frac{1}{z^*}\right)$	$\frac{1}{R_x}$
$x_1[n] * x_2[n]$	$X_1(z)X_2(z)$	Contains $R_{x_1} \bigcap R_{x_2}$
Initial value theorem: $x[n] = 0, \quad n < 0$ then	$x[0] = \lim_{z \to \infty} X(z)$	
Final value theorem: If (1) $x[n] = 0, \quad n < 0$ and (2) all singularities of $(1 - z^{-1})X(z)$ are inside the unit circle, then	$x[\infty] = \lim_{z \to 1} (1 - z^{-1}) X(z)$	