Unilateral Laplace Transform

$$X(s) = \int_{0^-}^{\infty} x(t)e^{-st}dt$$

Theorems

$x(t)$	$X(s)$	ROC
$x(t-t_0)$	$e^{-st_0}X(s)$	R
$e^{s_0t}x(t)$	$X(s-s_0)$	$R+Re(s_0)$
$x(at)$	$\frac{1}{\lvert a\rvert}X\left(\frac{s}{a}\right)$	aR
$x^*(t)$	$X(s^*)^*$	R
$(x_1 * x_2)(t)$	$X_1(s)X_2(s)$	$R_1 \bigcap R_2$
$-tx(t)$	$\dfrac{\mathrm{d}x}{\mathrm{d}s}$	R
$\dfrac{\mathrm{d}^n x}{\mathrm{d}t^n}$	$s^nX(s) - \sum_{i=0}^{n-1} s^{n-i-1}\dfrac{\mathrm{d}^i x}{\mathrm{d}t^i}\vert_{t=0^-}$	R

Transforms

Signal	Transform	ROC
$\delta(t-T)$	e^{-sT}	$\mathbb{C}$
$\frac{t^{n-1}}{(n-1)!}u(t)$	$\frac{1}{s^n}$	$Re(s) > 0$
$\frac{t^{n-1}}{(n-1)!}e^{-at}u(t)$	$\frac{1}{(s+a)^n}$	$Re(s) > a$
$e^{-at}\cos(\omega_0 t)u(t)$	$\frac{s+a}{(s+a)^2+\omega_0^2}$	$Re(s) > a$
$e^{-at}\sin(\omega_0 t)u(t)$	$\frac{\omega_0}{(s+a)^2+\omega_0}$	$Re(s) > a$