Specific Unilateral Laplace Transform Pairs			
Signal	$x(t) = \mathcal{L}^{-1}[X(s)]$		$X(s) = \int_0^\infty x(t)e^{-st}dt$
Unit impulse	$\delta(t)$	$\Longleftrightarrow$	1
Unit step	$u(t) = \begin{cases} 1, & t > 0 \\ 0, & t < 0 \end{cases}$	$\Longleftrightarrow$	$\frac{1}{s}$
Exponential	$e^{-\alpha t}\,u(t)$	$\Longleftrightarrow$	$\frac{1}{s+\alpha}$
Power of t	$t^n\,u(t)$	$\Longleftrightarrow$	$\frac{n!}{s^{n+1}}$
Damped power of t	$t^n\,e^{-\alpha t}\,u(t)$	$\Longleftrightarrow$	$\frac{n!}{(s+\alpha)^{n+1}}$
Sine	$\sin(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{\beta}{s^2+\beta^2}$
Cosine	$\cos(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{s}{s^2+\beta^2}$
Damped sine	$e^{-\alpha t}\sin(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{\beta}{(s+\alpha)^2+\beta^2}$
Damped cosine	$e^{-\alpha t}\cos(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{s+\alpha}{(s+\alpha)^2+\beta^2}$
t times damped sine	$t\,e^{-\alpha t}\sin(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{2\beta\,(s+\alpha)}{((s+\alpha)^2+\beta^2)^2}$
t times damped cosine	$t\,e^{-\alpha t}\cos(\beta t)\,u(t)$	$\Longleftrightarrow$	$\frac{(s+\alpha)^2-\beta^2}{((s+\alpha)^2+\beta^2)^2}$

2nd order step $\quad 1-\frac{e^{-\zeta\omega_n t}}{\sqrt{1-\zeta^2}}\sin\left(\omega_n\sqrt{1-\zeta^2}\,t+\phi\right) \quad \Leftrightarrow \quad \frac{\omega_n^2}{s\left(s^2+2\zeta\omega_n s+\omega_n^2\right)}$

$\phi = \cos^{-1}\zeta$

Unilateral Laplace Transform Properties			
Property	$x(t) = \mathcal{L}^{-1}[X(s)]$		$X(s) = \int_0^\infty x(t)e^{-st}dt$
Linearity	$Ax_1(t)+Bx_2(t)$	$\Longleftrightarrow$	$AX_1(s)+BX_2(s)$
Scale change	$x(at)$	$\Longleftrightarrow$	$\frac{1}{a}X\left(\frac{s}{a}\right),\ a>0$
Time shift	$x(t-T)\,u(t-T)$	$\Longleftrightarrow$	$e^{-sT}X(s),\ T>0$
frequency shift	$e^{-\alpha t}x(t)$	$\Longleftrightarrow$	$X(s+\alpha)$
Differentiation*	$\frac{dx(t)}{dt}$	$\Longleftrightarrow$	$s\,X(s)-x(0^-)$
Times t	$t\,x(t)$	$\Longleftrightarrow$	$\frac{-dX(s)}{ds}$
Integration	$\int_0^t x(\tau)\,d\tau$	$\Longleftrightarrow$	$\frac{X(s)}{s}$
Convolution	$\int_0^t x_1(\tau)\,x_2(t-\tau)\,d\tau$	$\Longleftrightarrow$	$X_1(s)\,X_2(s)$
Conjugation	$x^*(t)$	$\Longleftrightarrow$	$X^*(s^*)$
Initial value (if it exists)	$x(0^+)$	$\Longleftrightarrow$	$\lim_{s\to\infty} s\,X(s)$
Final value (if it exists)	$x(\infty)$	$\Longleftrightarrow$	$\lim_{s\to 0} s\,X(s)$

$$^{*}\,x''(t)=\frac{d^2x(t)}{dt^2}=s^2X(s)-s\,x(0)-x'(0)$$