BASIC LAPLACE TRANSFORMATION PROPERTIES

PROPERTIES	TIME DOMAIN	FREQUENCY DOMAIN
Independent Variable	t	s
Signal Representation	$f(t)$	$F(s)$
Uniqueness	$\mathcal{L}^{-1}\{F(s)\}(=)[f(t)]u(t)$	$\mathcal{L}\{f(t)\}=F(s)$
Linearity	$Af_1(t)+Bf_2(t)$	$AF_1(s)+BF_2(s)$
Integration	$\int_0^t f(\tau)\,d\tau$	$\frac{F(s)}{s}$
Differentiation	$\frac{df(t)}{dt}$ $\frac{d^2f(t)}{dt^2}$ $\frac{d^3f(t)}{dt^3}$	$sF(s)-f(0-)$ $s^2F(s)-sf(0-)-f'(0-)$ $s^3F(s)-s^2f(0-)-sf'(0-)-f''(0-)$
t-Translation	$[f(t-a)]u(t-a)$	$e^{-\alpha t}F(s)$
s-Translation	$e^{-\alpha t}f(t)$	$F(s+\alpha)$
Scaling	$f(at)$	$\frac{1}{a}F\left(\frac{s}{a}\right)$
Final Value	$\lim_{t\to\infty} f(at)$	$\lim_{s\to 0} s\,F(at)$
Initial Value	$\lim_{t\to 0+} f(at)$	$\lim_{s\to\infty} s\,F(at)$