

Table for Laplace Transforms

$f(t)$	$F(s) = L\{f(t)\} = \int_0^\infty e^{-st} f(t) dt$
$g(t)$	$G(s) = L\{g(t)\} = \int_0^\infty e^{-st} g(t) dt$
$\alpha f(t) + \beta g(t)$	$\alpha F(s) + \beta G(s)$ (linear property)
$f'(t)$	$sF(s) - f(0)$ (derivative formula)
$f''(t)$	$s^2F(s) - f(0)s - f'(0)$
1	$\frac{1}{s}$
t	$\frac{1}{s^2}$
t^n	$\frac{n!}{s^{n+1}}$
e^{at}	$\frac{1}{s-a}$
$\sin kt$	$\frac{k}{s^2+k^2}$
$\cos kt$	$\frac{s}{s^2+k^2}$
$step_a(t)$ ($a \geq 0$)	$\frac{e^{-as}}{s}$
$e^{at} f(t)$	$F(s-a)$ (translation on s-variable)
$t^n f(t)$	$(-1)^n \frac{d^n}{ds^n} F(s)$ (derivative of transforms)
$f(t) * g(t)$	$F(s)G(s)$ (used for taking inverse)
$step_a(t)f(t)$	$e^{-as}L\{f(t+a)\}$ (translation on t-variable)
$step_a(t)f(t-a)$	$e^{-as}F(s)$ (used for taking inverse)