

List of Laplace transform formulas:

$f(t)$	$\mathcal{L}[f](s)$
1	$\frac{1}{s}$
$t$	$\frac{1}{s^2}$
$e^{rt}$	$\frac{1}{s-r}$
$\cos \mu t$	$\frac{s}{s^2+\mu^2}$
$\sin \mu t$	$\frac{\mu}{s^2+\mu^2}$
$e^{\lambda t} \cos(\mu t)$	$\frac{s-\lambda}{(s-\lambda)^2+\mu^2}$
$e^{\lambda t} \sin(\mu t)$	$\frac{\mu}{(s-\lambda)^2+\mu^2}$
$e^{at} f(t)$	$\mathcal{L}[f](s-a)$
$f(t-c)u_c(t)$	$e^{-cs}\mathcal{L}[f](s)$
$f(t-c)H(t-c)$	$e^{-cs}\mathcal{L}[f](s)$
$\delta(t-c)$	$e^{-cs}$
$\int_0^t f(t-\tau)g(\tau)d\tau$	$\mathcal{L}[f](s)\mathcal{L}[g](s)$
$f'(t)$	$s\mathcal{L}[f](s) - f(0)$
$f''(t)$	$s^2\mathcal{L}[f](s) - sf(0) - f'(0)$
$tf(t)$	$-\frac{d}{ds}(\mathcal{L}[f](s))$
$te^{rt}$	$\frac{1}{(s-r)^2}$
$t \sin(\mu t)$	$\frac{2\mu s}{(s^2+\mu^2)^2}$

$$\mathcal{L}[f](s) = \int_0^{\infty} e^{-st} f(t) dt$$

$$u_c(t) = H(t-c) = \begin{cases} 0, & t < c \\ 1, & t \geq c \end{cases}$$