

TABLE 1. Laplace Transform Table.

$f(t)$	$\mathcal{L}\{f(t)\}$
1	$\frac{1}{s}, s > 0$
$e^{at}$	$\frac{1}{s-a}, s > a$
$t^n$	$\frac{n!}{s^{n+1}}, s > 0$
$\sin at$	$\frac{a}{s^2+a^2}, s > 0$
$\cos at$	$\frac{s}{s^2+a^2}, s > 0$
$\sinh at$	$\frac{a}{s^2-a^2}, s >  a $
$\cosh at$	$\frac{s}{s^2-a^2}, s >  a $
$e^{at} \sin bt$	$\frac{b}{(s-a)^2+b^2}, s > a$
$e^{at} \cos bt$	$\frac{s-a}{(s-a)^2+b^2}, s > a$
$t^n e^{at}$	$\frac{n!}{(s-a)^{n+1}}, s > a$
$u_c(t)$	$\frac{e^{-cs}}{s}, s > 0$
$u_c(t)f(t-c)$	$e^{-cs}F(s)$
$e^{ct}f(t)$	$F(s-c)$
$\int_0^t f(t-\tau)g(\tau)d\tau$	$F(s)G(s)$
$\delta(t-c)$	$e^{-cs}$

Common integral formulas:

- (1)  $\int \sin^2(u) du = \frac{1}{2}u - \frac{1}{4} \sin(2u) + C$
- (2)  $\int \cos^2(u) du = \frac{1}{2}u + \frac{1}{4} \sin(2u) + C$
- (3)  $\int u \cos(u) du = \cos(u) + u \sin(u) + C$
- (4)  $\int u \sin(u) du = \sin(u) - u \cos(u) + C$
- (5)  $\int e^{au} \sin(bu) du = \frac{e^{au}}{a^2+b^2} (a \sin(bu) - b \cos(bu)) + C$
- (6)  $\int e^{au} \cos(bu) du = \frac{e^{au}}{a^2+b^2} (a \cos(bu) + b \sin(bu)) + C$