



Laplace Transforms

$$f(t) = \mathcal{L}^{-1}\{F(s)\}$$

$$F(s) = \mathcal{L}\{f(t)\}$$

1.	1	$\frac{1}{s}$
2.	e^{at}	$\frac{1}{s-a}$
3.	t^n	$\frac{n!}{s^{n+1}}$
4.	$t^p, p > -1$	$\frac{\Gamma(p+1)}{s^{p+1}}$
5.	\sqrt{t}	$\frac{\sqrt{\pi}}{2s^{3/2}}$
6.	$\sin(at)$	$\frac{a}{s^2 + a^2}$
7.	$\cos(at)$	$\frac{s}{s^2 + a^2}$
8.	$t \sin(at)$	$\frac{2as}{(s^2 + a^2)^2}$
9.	$t \cos(at)$	$\frac{s^2 - a^2}{(s^2 + a^2)^2}$
10.	$\sin(at) - at \cos(at)$	$\frac{2a^3}{(s^2 + a^2)^2}$
11.	$\sin(at) + at \cos(at)$	$\frac{2as^2}{(s^2 + a^2)^2}$
12.	$\cos(at) - at \sin(at)$	$\frac{s(s^2 - a^2)}{(s^2 + a^2)^2}$
13.	$\cos(at) + at \sin(at)$	$\frac{s(s^2 + 3a^2)}{(s^2 + a^2)^2}$



$$14. \quad \sin(at + b) \qquad \frac{s \sin(b) + a \cos(b)}{s^2 + a^2}$$

$$15. \quad \cos(at + b) \qquad \frac{(s \cos(b) - a \sin(b))}{s^2 + a^2}$$

$$16. \quad \sinh(at) \qquad \frac{a}{s^2 - a^2}$$

$$17. \quad \cosh(at) \qquad \frac{s}{s^2 - a^2}$$

$$18. \quad e^{at} \sin(bt) \qquad \frac{b}{(s - a)^2 + b^2}$$

$$19. \quad e^{at} \cos(bt) \qquad \frac{s - a}{(s - a)^2 + b^2}$$

$$20. \quad e^{at} \sinh(bt) \qquad \frac{b}{(s - a)^2 - b^2}$$

$$21. \quad e^{at} \cosh(bt) \qquad \frac{s - a}{(s - a)^2 - b^2}$$