

1. $\mathcal{L} [af(t) + bg(t)] = aF(s) + bG(s), a, b \in \mathbf{R}$

2. $\mathcal{L} [f(at)] = \frac{1}{a}F\left(\frac{s}{a}\right), a > 0$

3. $\mathcal{L} [f(t - a)] = e^{-as}F(s), a \geq 0$

4. $\mathcal{L} [e^{at}f(t)] = F(s - a), a \in \mathbf{R}$

5. $\mathcal{L} [t^n f(t)] = (-1)^n F^{(n)}(s)$

6. $\mathcal{L} \left[\int_0^t f(u)du \right] = \frac{1}{s}F(s)$

7. $\mathcal{L} [f^{(n)}(t)] = s^n F(s) - s^{n-1}f(0) - s^{n-2}f'(0) - \dots - sf^{(n-2)}(0) - f^{(n-1)}(0)$

8. $\mathcal{L} [(f * g)(t)] = F(s)G(s)$

$f(t), (t \geq 0)$	$F(s)$	$f(t), (t \geq 0)$	$F(s)$
1	$\frac{1}{s}$	$e^{at} \cos bt$	$\frac{s-a}{(s-a)^2+b^2}$
t	$\frac{1}{s^2}$	$t \sin bt$	$\frac{2bs}{(s^2+b^2)^2}$
t^n	$\frac{n!}{s^{n+1}}$	$t \cos bt$	$\frac{s^2-b^2}{(s^2+b^2)^2}$
e^{at}	$\frac{1}{s-a}$	$t^2 \sin bt$	$\frac{2b(3s^2-b^2)}{(s^2+b^2)^3}$
te^{at}	$\frac{1}{(s-a)^2}$	$t^2 \cos bt$	$\frac{2s(s^2-3b^2)}{(s^2+b^2)^3}$
$t^n e^{at}$	$\frac{n!}{(s-a)^{n+1}}$	$te^{at} \sin bt$	$\frac{2b(s-a)}{[(s-a)^2+b^2]^2}$
$\sin bt$	$\frac{b}{s^2+b^2}$	$te^{at} \cos bt$	$\frac{(s-a)^2-b^2}{[(s-a)^2+b^2]^2}$
$\cos bt$	$\frac{s}{s^2+b^2}$	$y'(t)$	$sY(s) - y(0)$
$e^{at} \sin bt$	$\frac{b}{(s-a)^2+b^2}$	$y''(t)$	$s^2Y(s) - sy(0) - y'(0)$