

Laplace Transforms of Common Functions (Version 2)

In the following, α and ω are real-valued constants, and, unless otherwise noted, $s > 0$

<u>$f(t)$</u>	<u>$F(s) = \mathcal{L}[f(t)] _s$</u>	<u>Restrictions</u>
1	$\frac{1}{s}$	
t	$\frac{1}{s^2}$	
t^n	$\frac{n!}{s^{n+1}}$	$n = 1, 2, 3, \dots$
$\frac{1}{\sqrt{t}}$	$\frac{\sqrt{\pi}}{\sqrt{s}}$	
t^α	$\frac{\Gamma(\alpha + 1)}{s^{\alpha+1}}$	$-1 < \alpha$
$e^{\alpha t}$	$\frac{1}{s - \alpha}$	$\alpha < s$
$e^{i\alpha t}$	$\frac{1}{s - i\alpha}$	
$\cos(\omega t)$	$\frac{s}{s^2 + \omega^2}$	
$\sin(\omega t)$	$\frac{\omega}{s^2 + \omega^2}$	
$\text{step}_\alpha(t), \text{step}(t - \alpha)$	$\frac{e^{-\alpha s}}{s}$	$0 \leq \alpha$
$\delta(t)$	1	
$\delta_\alpha(t), \delta(t - \alpha)$	$e^{-\alpha s}$	$0 \leq \alpha$