PLOT

Table: Laplace Transformation for Elementary Functions

Differential Equations

Spring 2025

$f(t) = \mathcal{L}^{-1}\{F(s)\}$	$F(s) = \mathcal{L}\{f(t)\}$
1	$\dfrac{1}{s}, s > 0$
e^{at}	$\dfrac{1}{s-a}, s > a$
$t^n, n \in \mathbb{Z}_{>0}$	$\dfrac{n!}{s^{n+1}}, s > 0$
$\sin(at)$	$\dfrac{a}{s^2 + a^2}, s > 0$
$\cos(at)$	$\dfrac{s}{s^2 + a^2}, s > 0$
$\sinh(at)$	$\dfrac{a}{s^2 - a^2}, s > 0$
$\cosh(at)$	$\dfrac{s}{s^2 - a^2}, s > 0$
$e^{ct}f(t)$	$F(s-c)$
$u_c(t) = u(t-c)$	$\dfrac{e^{-cs}}{s}$
$u_c(t)f(t-c) = u(t-c)f(t-c)$	$e^{-cs}F(s)$
$f'(t)$	$s\mathcal{L}\{f\} - f(0)$
$f''(t)$	$s^2\mathcal{L}\{f\} - sf(0) - f'(0)$
$f(ct)$	$\dfrac{1}{c}F\left(\dfrac{s}{c}\right)$
$\delta(t-c)$	e^{-cs}
$(f * g)(t) = \int_0^t f(t-\tau)g(\tau)d\tau$	$F(s)G(s)$