MATH2065: INTRO TO PDEs

Laplace Transforms Table

Function	Laplace Transform
$f(t)$	$F(s) = \int_0^\infty e^{-st} f(t)\, dt$
e^{at}	$\frac{1}{s-a} \qquad (s > a)$
1	$\frac{1}{s} \qquad (s > 0)$
$\cos \omega t$	$\frac{s}{s^2+\omega^2} \qquad (s > 0)$
$\sin \omega t$	$\frac{\omega}{s^2+\omega^2} \qquad (s > 0)$
$\cosh at$	$\frac{s}{s^2-a^2} \qquad (s > \lvert a \rvert)$
$\sinh at$	$\frac{a}{s^2-a^2} \qquad (s > \lvert a \rvert)$
$t^n, \quad n \geq 0$	$\frac{n!}{s^{n+1}} \qquad (s > 0)$
$H(t-b)$ (Heaviside unit-step)	$\frac{1}{s} e^{-bs} \qquad (s > 0, b \geq 0)$
$\delta(t-b)$ (Dirac delta)	$e^{-bs} \qquad (s > 0, b > 0)$
$a\, f(t) + b\, g(t)$	$a\, F(s) + b\, G(s)$ (linearity)
$e^{at} f(t)$	$F(s-a)$ (s-shifting)
$H(t-b) f(t-b)$	$e^{-bs} F(s)$ (t-shifting)
$(-t)^n f(t)$	$\frac{d^n}{ds^n} F(s)$ (s-derivatives)
$f'(t)$	$s\, F(s) - f(0)$ (t-derivative)
$f''(t)$	$s^2\, F(s) - s\, f(0) - f'(0)$ (second t-derivative)
$f \star g = \int_0^t f(t-\bar{t})\, g(\bar{t})\, d\bar{t}$	$F(s)\, G(s)$ (convolution)