Laplace Transforms and Properties

$$F(s) = \mathcal{L}\{f\} \equiv \int_0^\infty e^{-st} f(t) ds$$

$f(t)$	$F(s)$		$h(t)$	$H(s)$
1	$\frac{1}{s}$		$e^{at} f(t)$	$F(s-a)$
t^n	$\frac{n!}{s^{n+1}}$		$f'(t)$	$sF(s) - f(0)$
e^{at}	$\frac{1}{s-a}$		$f''(t)$	$s^2F(s) - f(0)s - f'(0)$
$\sin at$	$\frac{a}{s^2+a^2}$		$f^{(n)}(t)$	$s^nF(s) - f(0)s^{n-1} - \cdots - f^{(n-1)}(0)$
$\cos at$	$\frac{s}{s^2+a^2}$		$t^n f(t)$	$(-1)^n \frac{d^n F}{ds^n}$
$\sinh at$	$\frac{a}{s^2-a^2}$		$\int_0^t f(\tau) g(t-\tau) d\tau$	$F(s)G(s)$
$\cosh at$	$\frac{s}{s^2-a^2}$		$\frac{f(t)}{t}$	$\int_s^\infty F(\lambda) d\lambda$