## Table of Laplace Transforms

| $h(t) = \mathcal{L}^{-1}[H](t)$ | | $H(s) = \mathcal{L}[h](s)$ | |
|---|---|---|---|
| $t^n e^{at}$ | for $n \geq 0$ | $\dfrac{n!}{(s-a)^{n+1}}$ | for $s > a$ |
| $e^{at}\cos(bt)$ | | $\dfrac{s-a}{(s-a)^2+b^2}$ | for $s > a$ |
| $e^{at}\sin(bt)$ | | $\dfrac{b}{(s-a)^2+b^2}$ | for $s > a$ |
| $e^{at}\cosh(bt)$ | | $\dfrac{s-a}{(s-a)^2-b^2}$ | for $s > a+\lvert b\rvert$ |
| $e^{at}\sinh(bt)$ | | $\dfrac{b}{(s-a)^2-b^2}$ | for $s > a+\lvert b\rvert$ |
| $t^n j(t)$ | for $n \geq 0$ | $(-1)^n J^{(n)}(s)$ | where $J(s) = \mathcal{L}[j](s)$ |
| $j'(t)$ | | $s\,J(s) - j(0)$ | where $J(s) = \mathcal{L}[j](s)$ |
| $e^{at} j(t)$ | | $J(s-a)$ | where $J(s) = \mathcal{L}[j](s)$ |
| $u(t-c)j(t-c)$ | for $c \geq 0$ | $e^{-cs}J(s)$ | where $J(s) = \mathcal{L}[j](s)$ |
| $\delta(t-c)j(t)$ | for $c \geq 0$ | $e^{-cs}j(c)$ | |

Here $a$, $b$, and $c$ are real numbers; $n$ is an integer; $j(t)$ is any function that is nice enough; $u(t)$ is the unit step (Heaviside) function; $\delta(t)$ is the unit impulse (Dirac delta).