### Short Table of Laplace Transforms

<table>
<thead>
<tr>
<th>$f(t)$</th>
<th>$\hat{f}(s) = \mathcal{L}<a href="s">f</a>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\frac{1}{s}$</td>
</tr>
<tr>
<td>$t$</td>
<td>$\frac{1}{s^2}$</td>
</tr>
<tr>
<td>$t^n$</td>
<td>$\frac{n!}{s^{n+1}}$</td>
</tr>
<tr>
<td>$\frac{1}{\sqrt{t}}$</td>
<td>$\sqrt{\frac{\pi}{s}}$</td>
</tr>
<tr>
<td>$e^{at}$</td>
<td>$\frac{1}{s-a}$</td>
</tr>
<tr>
<td>$t^n e^{at}$</td>
<td>$\frac{n!}{(s-a)^{n+1}}$</td>
</tr>
<tr>
<td>$\sin(at)$</td>
<td>$\frac{a}{s^2 + a^2}$</td>
</tr>
<tr>
<td>$\cos(at)$</td>
<td>$\frac{s}{s^2 + a^2}$</td>
</tr>
<tr>
<td>$t \sin(at)$</td>
<td>$\frac{2as}{(s^2 + a^2)^2}$</td>
</tr>
<tr>
<td>$t \cos(at)$</td>
<td>$\frac{s^2 - a^2}{(s^2 + a^2)^2}$</td>
</tr>
<tr>
<td>$\sinh(at)$</td>
<td>$\frac{a}{s^2 - a^2}$</td>
</tr>
<tr>
<td>$\cosh(at)$</td>
<td>$\frac{s}{s^2 - a^2}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$f(t)$</th>
<th>$\hat{f}(s) = \mathcal{L}<a href="s">f</a>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$af(t) + bg(t)$</td>
<td>$a\hat{f}(s) + b\hat{g}(s)$</td>
</tr>
<tr>
<td>$f'(t)$</td>
<td>$s\hat{f}(s) - f(0+)$</td>
</tr>
<tr>
<td>$f^{(n)}(t)$</td>
<td>$s^n\hat{f}(s) - s^{n-1}f(0) - \ldots - f^{(n-1)}(0)$</td>
</tr>
<tr>
<td>$\int_0^t f(\tau) d\tau$</td>
<td>$\frac{1}{s} \hat{f}(s)$</td>
</tr>
<tr>
<td>$tf(t)$</td>
<td>$-\hat{f}'(s)$</td>
</tr>
<tr>
<td>$t^n f(t)$</td>
<td>$(-1)^n \hat{f}^{(n)}(s)$</td>
</tr>
<tr>
<td>$\frac{1}{t} f(t)$</td>
<td>$\int_s^\infty \hat{f}^{(n)}(\sigma) d\sigma$</td>
</tr>
<tr>
<td>$e^{at} f(t)$</td>
<td>$\hat{f}(s-a)$</td>
</tr>
<tr>
<td>$f(t-a) H(t-a)$</td>
<td>$e^{-as} \hat{f}(s)$</td>
</tr>
<tr>
<td>$(f*g)(t)$</td>
<td>$\hat{f}(s) \hat{g}(s)$</td>
</tr>
</tbody>
</table>

Note: $\sinh(x) = \frac{e^x - e^{-x}}{2}$, $\cosh(x) = \frac{e^x + e^{-x}}{2}$