Table of Laplace transforms

$f(t)$	$F(s)$
1. t^n, n pos int	$\frac{n!}{s^{n+1}}, \quad s>0$
2. e^{at}	$\frac{1}{s-a} \quad s>a$
3. $\sin(at)$	$\frac{a}{s^2+a^2}, \quad s>0$
4. $\cos(at)$	$\frac{s}{s^2+a^2}, \quad s>0$
5. $\mathrm{e}^{ct}f(t)$	$F(s-c)$
6. $u(t-c)$	$\frac{\mathrm{e}^{-cs}}{s}$
7. $u(t-c)f(t-c)$	$\mathrm{e}^{-cs}F(s)$

$f(t)$	$F(s)$
8. $f(t)*g(t)$	$F(s)G(s)$
9. $f'(t)$	$sF(s)-f(0)$
10. $f''(t)$	$s^2F(s)-sf(0)-f'(0)$
11. $\int_0^t g(\tau)\,d\tau$	$G(s)/s$
12. $\frac{1}{\sqrt{\pi t}}\mathrm{e}^{-a^2/4t}$	$\mathrm{e}^{-a\sqrt{s}}/\sqrt{s}$
13. $\frac{a}{2\sqrt{\pi t^3}}\mathrm{e}^{-a^2/4t}$	$\mathrm{e}^{-a\sqrt{s}}$
14. $\mathrm{erf}\left(\frac{t}{2a}\right)$	$\mathrm{e}^{a^2s^2}\mathrm{erfc}(as)/s$
14. $\mathrm{erfc}\left(\frac{a}{2\sqrt{t}}\right)$	$\mathrm{e}^{-a\sqrt{s}}/s$

Notes

Heaviside is $u(t-c)$. The convolution is $(f*g)(t)$. The error function $\mathrm{erf}(x)=\frac{2}{\sqrt{\pi}}\int_0^x \mathrm{e}^{-z^2}\,dz$, and $\mathrm{erfc}(x)=1-\mathrm{erf}(x)$.

Table of Fourier Transforms

$f(x)=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty}F(\alpha)\mathrm{e}^{i\alpha x}\,d\alpha$	$F(\alpha)=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty}f(x)\mathrm{e}^{-i\alpha x}\,dx$
1. $f^{(n)}(x)$	$(i\alpha)^nF(\alpha)$
2. $xf(x)$	$iF'(\alpha)$
3. $f(x-c)$	$\mathrm{e}^{-ic\alpha}F(\alpha)$
4. $f*g$	$\sqrt{2\pi}F(s)G(s)$
5. $f(x)g(x)$	$\frac{1}{\sqrt{2\pi}}F(-\alpha)*G(-\alpha)$
6. $\mathrm{e}^{-c\lvert x\rvert}$	$\sqrt{\frac{2}{\pi}}\frac{c}{\alpha^2+c^2}$
7. $\frac{1}{x^2+c^2}$	$\sqrt{\frac{\pi}{2}}\mathrm{e}^{-c\lvert\alpha\rvert}/c$
8. $\exp\left(-x^2\right)$	$\frac{1}{\sqrt{2}}\exp\left(-\frac{\alpha^2}{4}\right)$
10. $\delta(x)$	$\frac{1}{\sqrt{2\pi}}$
11. 1	$\sqrt{2\pi}\,\delta(\alpha)$

Table of Fourier sine transforms

$f(x) = \int_0^\infty F_s(\alpha)\sin(\alpha x)\,d\alpha$	$\mathcal{S}[f(x)] = F_s(\alpha) = \frac{2}{\pi}\int_0^\infty f(x)\sin(\alpha x)\,dx$
1. $f'(x)$	$-\alpha F_c(\alpha)$
2. $f''(x)$	$-\alpha^2 F_s(\alpha) + \frac{2}{\pi}\alpha f(0)$
3. $\frac{x}{x^2+\beta^2}$	$\mathrm{e}^{-\alpha\beta}$
4. $\mathrm{e}^{-\beta x}$	$\frac{2}{\pi}\frac{\alpha}{\alpha^2+\beta^2}$
5. 1	$\frac{2}{\pi}\frac{1}{\alpha}$

Table of Fourier cosine transforms

$f(x) = \int_0^\infty F_c(\alpha)\cos(\alpha x)\,d\alpha$	$\mathcal{C}[f(x)] = F_c(\alpha) = \frac{2}{\pi}\int_0^\infty f(x)\cos(\alpha x)\,dx$
1. $f'(x)$	$\alpha F_s(\alpha) - \frac{2}{\pi}f(0)$
2. $f''(x)$	$-\alpha^2 F_c(\alpha) - \frac{2}{\pi}f'(0)$
3. $\frac{\beta}{x^2+\beta^2}$	$\mathrm{e}^{-\alpha\beta}$
4. $\mathrm{e}^{-\beta x}$	$\frac{2}{\pi}\frac{\beta}{\alpha^2+\beta^2}$
5. $\mathrm{e}^{-\beta x^2}$	$2\frac{1}{\sqrt{4\pi\beta}}\mathrm{e}^{-\alpha^2/4\beta}$