Basic Fourier-transform pairs

Table of Fourier Transform Pairs	
Time-Domain: x(t)	***Frequency-Domain: X(f)***
$e^{-at}u(t) \quad (a>0)$	$\frac{1}{a+j2\pi f}$
$e^{bt}u(-t) \quad (b>0)$	$\frac{1}{a-j2\pi f}$
$u(t+\frac{1}{2}T)-u(t-\frac{1}{2}T)$	$\frac{\sin(\pi\ fT)}{\pi\ f}$
$\frac{\sin(2\pi\ f_b t)}{\pi\ t}$	$u(f+f_b)-u(f-f_b)$
$\delta(t)$	1
$\delta(t-t_d)$	$e^{-j2\pi f t_d}$
$u(t)$	$\frac{\delta(f)}{2}+\frac{1}{j2\pi f}$
$\cos 2\pi f_0 t$	$\frac{1}{2}\delta(f-f_0)+\frac{1}{2}\delta(f+f_0)$
$\sin 2\pi f_0 t$	$\frac{1}{2j}\delta(f-f_0)-\frac{1}{2j}\delta(f+f_0)$
$\sum_{k=-\infty}^{\infty} a_k e^{j2\pi f_0 kt}$	$\sum_{k=-\infty}^{\infty} a_k \delta(f-kf_0)$
$\sum_{k=-\infty}^{\infty} \delta(t-nT)$	$\frac{1}{T}\sum_{k=-\infty}^{\infty} \delta(f-\frac{k}{T})$

Table of Laplace Transform Pairs	
$x(t)$	$X(s)$
1	$\frac{1}{s} \qquad s > 0$
$t^n \quad n$ an integer	$\frac{n!}{s^{n+1}} \qquad s > 0$
e^{at}	$\frac{1}{s-a} \qquad s > a$
$\sin bt$	$\frac{b}{s^2+b^2} \qquad s > 0$
$\cos bt$	$\frac{s}{s^2+b^2} \qquad s > 0$
$e^{at} f(t)$	$F(s-a)$
$e^{at} t^n \quad n$ an integer	$\frac{n!}{(s-a)^{n+1}} \qquad s > a$
$e^{at} \sin bt$	$\frac{b}{(s-a)^2+b^2} \qquad s > a$
$e^{at} \cos bt$	$\frac{(s-a)}{(s-a)^2+b^2} \qquad s > a$
$t \sin bt$	$\frac{2bs}{\left(s^2+b^2\right)^2} \qquad s > 0$
$t \cos bt$	$\frac{s^2-b^2}{\left(s^2+b^2\right)^2} \qquad s > 0$
$\sum_{k=-\infty}^{\infty} \delta(t-nT)$	$\frac{1}{T} \sum_{k=-\infty}^{\infty} \delta(f-\frac{k}{T})$

Laplace transform operations

Operation	$f(t)$	$F(s)$
Addition	$f_1(t) \pm f_2(t)$	$F_1(s) \pm F_2(s)$
Scalar multiplication	$kf(t)$	$kF(s)$
Time Differentiation	$\frac{df(t)}{dt}$ $\frac{d^2 f(t)}{dt^2}$ $\frac{d^3 f(t)}{dt^3}$	$sF(s) - f(0^-)$ $s^2F(s) - sf(0^-) - f'(0^-)$ $s^3F(s) - s^2 f(0^-) - sf'(0^-) - f''(0^-)$
Integration	$\int f(t)dt$	$\frac{1}{s}F(s)$
Convolution	$f_1(t) * f_2(t)$	$F_1(s)F_2(s)$
Time Shift	$f_1(t-a)u(t-a), a \geq 0$	$e^{-as}F(s)$
Frequency Shift	$e^{-at}f(t)$	$F(s+a)$
Scaling	$f(at), a \geq 0$	$\frac{1}{a}F(\frac{s}{a})$
Initial Value	$f(0^+)$	$\lim_{s\to\infty} sF(s)$
Final Value	$f(\infty)$	$\lim_{s\to 0} sF(s)$, all poles of $sF(s)$ in LHS