Fourier Transform Summary

	$f(x)$	$\widehat{f}(k)$
Definition and inversion		
	$\frac{1}{2\pi}\int_{-\infty}^{\infty} e^{ikx}\widehat{f}(k)dk$	$\int_{-\infty}^{\infty} e^{-ikx}f(x)dx$
Examples		
1	$\dfrac{1}{1+x^2}$	$\pi e^{-\lvert k\rvert}$
2	$e^{-\lvert x\rvert}$	$\dfrac{2}{1+k^2}$
3	$\begin{cases}1 & \lvert x\rvert<1\\ 1/2 & x=0\\ 0 & \lvert x\rvert\geq 1\end{cases}$	$2\,\dfrac{\sin(k)}{k}$
4	$\dfrac{\sin(x)}{x}$	$\pi\begin{cases}1 & \lvert k\rvert<1\\ 1/2 & k=0\\ 0 & \lvert k\rvert>1\end{cases}$
5	$e^{-x^2/(2\sigma^2)}$	$\sqrt{2\pi}\,\sigma e^{-\sigma^2k^2/2}$
Properties		
0	$c_1f_1(x)+c_2f_2(x)$	$c_1\widehat{f}_1(k)+c_2\widehat{f}_2(k)$
1	$f(x+a)$	$e^{iak}\widehat{f}(k)$
2	$e^{iax}f(x)$	$\widehat{f}(k-a)$
3	$f(ax)$	$a^{-1}\widehat{f}(k/a)$
4	$f'(x)$	$ik\widehat{f}(k)$
5	$ixf(x)$	$-\widehat{f}'(k)$
6	$f*g(x)$	$\widehat{f}(k)\widehat{g}(k)$
7	$f(x)g(x)$	$(2\pi)^{-1}\widehat{f}*\widehat{g}(k)$

Note about the examples 3 and 4: The value of a Fourier or inverse Fourier transform is insensitive to changes of the input function at a single point. In property 6: $f*g(x)=\int_{-\infty}^{\infty}f(x-y)g(y)dy$

Laplace Transform Summary

	$y(t)$	$Y(s)$
Definition and inversion		
	$\frac{1}{2\pi i}\int_{\sigma-i\infty}^{\sigma+i\infty} e^{st}Y(s)ds$	$\int_0^{\infty} e^{-st}y(t)dt$
Examples		
1	e^{-at}	$\dfrac{1}{s+a}$
2	$\sin(\omega t)$	$\dfrac{\omega}{s^2+\omega^2}$
3	$\cos(\omega t)$	$\dfrac{s}{s^2+\omega^2}$
Properties		
0	$c_1y_1(t)+c_2y_2(t)$	$c_1Y_1(s)+c_2Y_2(s)$
1	$y'(t)$	$sY(s)-y(0)$
2	$ty(t)$	$-Y'(s)$
3	$e^{at}y(t)$	$Y(s-a)$
4	$u(t-a)y(t-a)$	$e^{-ac}Y(s)$
5	$y_1*y_2(t)$	$Y_1(s)Y_2(s)$

In property 4: $u(x)=\begin{cases}0 & x<0\\ 1 & x\geq 0\end{cases}$. In property 5: $y_1*y_2(t)=\int_0^t y_1(t-\tau)y_2(\tau)d\tau$