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integral transform

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Defines	kernel
Defines	transform parameter

A generic *integral transform* takes the form

$$F(p)=\int_{\alpha}^{\beta}K(p,t)f(t)dt,$$

with p being the *transform parameter*.

Note that the transform takes a function $f(t)$ and produces a new function $F(p)$.

The function $K(p,t)$ is called the *kernel* of the transform. The kernel of an integral transform, along with the `http://planetmath.org/DefiniteIntegral`limits α and β, distinguish a particular integral transform from another.

Examples

- Laplace transform

$$\alpha=0,\ \beta=\infty,\ K(p,t)=e^{-pt},$$

$$F(p)=\int\limits_{0}^{\infty}e^{-pt}f(t)dt.$$

- Laplace-Carson transform

$$\alpha=0,\ \beta=\infty,\ K(p,t)=pe^{-pt},$$

$$F(p)=\int\limits_{0}^{\infty}pe^{-pt}f(t)dt.$$

- Fourier transform

$$\alpha=-\infty,\ \beta=\infty,\ K(p,t)=\frac{1}{\sqrt{2\pi}}e^{-ipt},$$

$$F(p)=\frac{1}{\sqrt{2\pi}}\int\limits_{-\infty}^{\infty}e^{-ipt}f(t)dt.$$