Introduction To Integral Transforms

1 Definition

An integral transformation of a function, $f(x)$, yields another function, $g(y)$, by

$$g(y) = \int_C f(x)K(x,y)dx$$

Where C is typically $\mathbb{R}$ or $[0,\infty)$, although it is not limited to these. The function, $K(x,y)$, is known as the Kernel of the Integral Transform.

2 Examples

There are many different examples of Integral Transforms, with a few being:

- Fourier Transform
- Laplace Transform
- Radon Transform
- Hilbert Transform
- Mellin Transform

The first two of these will be the main focus of this course. Some of these, such as the Fourier, Laplace, and Mellin Transforms are invertible, but this is not a requirement.