(Source: https://en.wikipedia.org/wiki/Laplace_transform)

History [edit]

The Laplace transform is named after mathematician and astronomer Pierre-Simon Laplace, who used a similar transform (now called the z-transform) in his work on probability theory.[2] The current widespread use of the transform (mainly in engineering) came about during and soon after World War II [3] although it had been used in the 19th century by Abel, Lerch, Heaviside, and Bromwich.

The early history of methods having some similarity to Laplace transform is as follows. From 1744, Leonhard Euler investigated integrals of the form

$$z = \int X(x)e^{ax}\, dx \quad \text{and} \quad z = \int X(x)x^{A}\, dx$$

as solutions of differential equations but did not pursue the matter very far.[4]

Joseph Louis Lagrange was an admirer of Euler and, in his work on integrating probability density functions, investigated expressions of the form

$$\int X(x)e^{-ax}a^{x}\, dx,$$

which some modern historians have interpreted within modern Laplace transform theory.[5][6][*clarification needed*]

These types of integrals seem first to have attracted Laplace's attention in 1782 where he was following in the spirit of Euler in using the integrals themselves as solutions of equations.[7] However, in 1785, Laplace took the critical step forward when, rather than just looking for a solution in the form of an integral, he started to apply the transforms in the sense that was later to become popular. He used an integral of the form

$$\int x^{s}\varphi(x)\, dx,$$

akin to a Mellin transform, to transform the whole of a difference equation, in order to look for solutions of the transformed equation. He then went on to apply the Laplace transform in the same way and started to derive some of its properties, beginning to appreciate its potential power.[8]

Laplace also recognised that Joseph Fourier's method of Fourier series for solving the diffusion equation could only apply to a limited region of space because those solutions were periodic. In 1809, Laplace applied his transform to find solutions that diffused indefinitely in space.[9]