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# ON FOURIER-TRANSFORM, GENERALIZED FOURIER TRANSFORM AND THEIR APPLICATIONS

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**Abstract:** In this paper Fourier transform, generalized Fourier transform and their applications have been discussed. q-generalizations of these transforms have also been established.

**Keywords and Phrases:** Fourier transform, generalized Fourier transform, q-integral, q-exponential function.

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## 1. Introduction

We define the Fourier transform of the function $f(x)$ as,

$$F(k) = \mathcal{F}[f(x); k] = \int_{-\infty}^{\infty} f(x)e^{-ikx}dx, \tag{1.1}$$

provided, of course, that this integral exists. Sometimes it is also represented by,

$$F(k) = \mathcal{F}[f(x); k] = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(x)e^{-ikx}dx. \tag{1.2}$$

The Fourier transform was introduced by Fourier in 1811 but the notion of it as a transform did not occur in his work. Cauchy in 1816 produced a more mathematical and complete description of this Fourier transform. Here we shall discuss some properties of Fourier transform.