South East Asian J. of Mathematics and Mathematical Sciences
Vol. 18, No. 2 (2022), pp. 99-116

DOI: 10.56827/SEAJMMS.2022.1802.10 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

FOURIER TYPE TRANSFORMS AND THEIR CONVOLUTIONS ON $\mathbb{R}^n$

A. M. Mahajan and M. S. Chaudhary*

Department of Mathematics,
Walchand College of Arts and Science,
Solapur - 413006, Maharasthra, INDIA

E-mail : ammahajan19@gmail.com

*Department of Mathematics,
Shivaji University, Kolhapur - 416004, Maharashtra, INDIA

E-mail : m_s_chaudhary@rediffmail.com

(**Received:** *Sep. 11, 2021* **Accepted:** *Aug. 16, 2022* **Published:** *Aug. 30, 2022)*

Abstract: In this paper the operational properties of two integral transforms of Fourier type are defined. The purpose of the study is to define the convolution of the Fourier type transform on $L_1(\mathbb{R}^n)$ and $L_2(\mathbb{R}^n)$. Also we obtained the Inversion, Uniqueness and Plancherel's theorem of these two transform. Lastely we have applied these transform to differential equation of higher order for the solution.

Keywords and Phrases: Plancherel's theorem, Convolution, Hermite function.

2020 Mathematics Subject Classification: 42A38, 44A35.

1. Introduction

In literature we have studied the Fourier-sine and Fourier-cosine integral transforms([8], [9]). Along with these transforms Fourier transform were also studied and applied in many fields of Mathematics and Physics ([7], [9]). The Fourier transform plays an important role in engineering and science. It has vide applications in signal processing and communication theory. B. T Giang, N. M. Tuan [4] has given the operational properties of two integral transforms of Fourier type and