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ORIGINAL RESEARCH PAPER

Quaternion offset linear canonical transform in one-dimensional setting

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Abstract
In this paper, we introduce quaternion offset linear canonical transform of integrable and square integrable functions. Moreover, we show that the proposed transform satisfies all the respective properties like inversion formula, linearity, Moyal's formula, product theorem and the convolution theorem.

Keywords Offset linear canonical transform · Quaternion offset linear canonical transform · Moyal's formulla · Convolution

Mathematics Subject Classification Primary 42C40 · Secondary 42C15 · 47G10 · 42A38 · 42B10

1 Introduction

The classical Integral transform has been generalized to the six-parameter (A, B, C, D, p, q) transform called the offset linear canonical transform (OLCT). For a matrix parameter $\Lambda = \left[\begin{array}{cc|c} A & B & p \\ C & D & q \end{array}\right]$, the OLCT of any signal f is defined as

$$\mathcal{O}_\Lambda[f](w) = \int f(t)\mathcal{K}_\Lambda(t,w)dt, \tag{1.1}$$

where $\mathcal{K}_\Lambda(t,w)$ denotes the kernel of the OLCT and is given by

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