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ON THE CONTINUITY OF LINEAR CANONICAL BESSEL WAVELET TRANSFORMATIONS

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Abstract. Due to the extra degrees of freedom and simple geometrical manifestation, the linear canonical transform (LCT) has being broadly employed across several disciplines of science and engineering including signal processing, optical and radar systems, electrical and communication systems, quantum physics etc. The main objective of this paper is to study the linear canonical Hankel transformation and the continuous canonical Bessel wavelet transformation and some of their basic properties. The continuous Canonical Bessel wavelet transformation, its inversion formula and Parseval's relation for the continuous Canonical Bessel wavelet transformation are also studied.

1. Introduction

The theory of linear canonical transformation (LCT) was motivated by the work of two different projects by Collins [6] on the field of paraxial optics, on the other hand, Moshinsky and Quesne [11] in the field of nuclear physics in early seventies. The LCT is a four parameter class of linear integral transformation for studying the behaviour of many useful transformations and system responses in physics and engineering in general. Therefore, LCT is found as a powerful mathematical tool in many fields of physics and engineering. In this correspondence, we have defined the continuous Canonical Bessel wavelet transformation and associated properties. A general class of LCT has been studied by[1, 14]. The conventional canonical transformation represents any affine linear transformation in the (x, y) plane and specified by a 2×2 unimodular matrix A(i.e. determinant is one). For the sake of brevity, we may write the matrix as $A = (a, b; c, d)$

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