

ANALYSIS OF CLIFFORD-WAVELET TRANSFORM IN $Cl_{(3,1)}$

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Abstract: Clifford-wavelet transform in L^2 -spaces is defined in space-time algebra $Cl_{(3,1)}$ of Minkowski space with orthonormal vector basis. The properties of Clifford-wavelet transform are established. Plancherel's theorem and reproducing kernel is demonstrated. The inversion formula for Clifford-wavelet transform is established. The study is supported with examples and applications from Mathematical Physics.

Keywords and Phrases: Clifford-wavelet transform, similitude group, multivector, inversion formula.

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1. Introduction

In [12, 19] authors discussed the development and progress of Geometric Algebra. [2] have shown how continuous Clifford $Cl_{3,0}$ valued admissible wavelets were constructed using the similitude group $SIM(3)$, a subgroup of the affine group of \mathbb{R}^3 . In 2006, [25] constructed the Clifford algebra-valued admissible wavelets, which were associated to more than 2-dimensional euclidean groups with dilations. Admissibility conditions, reconstruction formula and Plancherel's theorem were established in [13]. In [6] authors have considered Clifford-valued functions defined on \mathbb{R}^n with representation in square integrable group. In the study of two-dimensional quaternion wavelet transform [10], authors have introduced continuous quaternion wavelet transform (CQWT) and established the admissibility condition in terms