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K-FUSION FRAMES IN QUATERNIONIC HILBERT SPACES

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Abstract. In [26] authors have defined and studied K-fusion frames in Hilbert spaces. Motivated by [26], we define K-fusion frames in Quaternionic Hilbert spaces and study their perturbations. Further, we define the woven K-fusion frames in Quaternionic Hilbert spaces. Finally, we study the Paley-Wiener type perturbation for weaving K-fusion frames in quaternionic Hilbert spaces.

1. Introduction

Frames [15] in Hilbert spaces were introduced in 1952 while studying the non-harmonic Fourier Series. But their potential was realized by the researchers after the work done by Daubechies et el. [5], due to its vast applications in various fields like signal and image processing, sigma-delta quantization, filter bank theory, sampling theory and wireless communication, for details one may refer to [11]. Over the past few years, many generalizations of frames were introduced and studied. Two of the generalization which is much appreciated by the researchers are fusion frames defined and studied by P. Casazza and G. kutyniok [12] and K-frames introduced and studied by *Găvruta* [7]. X. C. Xiao, M. L. Ding and Yu Can Zhu [25] have defined and studied the K-fusion frames in Hilbert spaces. In [6] Poumai and Kaushik have studied results concerning Riesz bases and frames in Banach spaces. In [23] Bemrose et al. have defined and studied the properties of weaving frames in Hilbert spaces which are used in distributed signal processing. For details regarding fusion frames and woven fusion frames one may refer to [9, 13, 14] and for details regarding weaving K-frames and their properties one may refer to [1, 2, 24, 27].

Hamilton discovered the field of quaternion which is a generalization of complex numbers. It is a four-dimensional non-commutative real algebra. Quaternions are used to study rotation in the higher dimensional Euclidean spaces, theory of relativity, Newtonian and quantum mechanics and general relativity in which Lorentz

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