Poincare Journal of Analysis & Applications
Vol. 8, No. 2 (2021), 145-155

SEMI-CONTINUOUS K-G-FRAMES

CHANDER SHEKHAR, SHIPRA†, AND RENU CHUGH

Date of Receiving : 24. 03. 2021
Date of Revision : 31. 12. 2021
Date of Acceptance : 31. 12. 2021

Abstract. In this paper, we introduce the concept of semi-continuous K-g-frames in Hilbert spaces. A characterization of semi-continuous K-g-frames in term of frame operator is given. It is proved that the image of semi-continuous K-g-frame under a bounded linear operator is again a semi-continuous K-g-frame. Also, we give a necessary and sufficient condition for the finite sum of semi-continuous K-g-frames to be semi-continuous K-g-frame. Finally, some stability results for semi-continuous K-g-frame is proved.

1. Introduction

The concept of frames for Hilbert spaces were introduced in 1952 by Duffin and Schaeffer [9], as a part of their research in non-harmonic Fourier series. In particular, they generalized Gabor's method to define frames for Hilbert spaces. Their work on frame theory was somewhat forgotten until 1986, when Daubechies, Grossman, and Meyer [7] brought it back to life. Thereafter, the theory of frames got more attention. Discrete and continuous frames have many application in both pure and applied mathematics. Today, frame theory has been extensively used in many field such as data compression, filter bank theory, coding and many other areas. For more details on frame theory we endorse the book of Christensen [6]. Applications of frames, especially in the last decade, motivated the researcher to find some generalization of frames like continuous frames [1, 14], g-frames [15], K-frames [12] and etc.

Our main purpose in this paper is to study a generalization of frames, named as semi-continuous K-g-frames. We introduce the notion of semi-continuous K-g-frames and set out to generalize some results of [3] to semi-continuous K-g-frames.

Throughout this paper, $\mathcal{H}$ and $\mathcal{K}$ are two Hilbert spaces, J is a countable index set, $(\mathcal{X}, \mu)$ is a measure space with positive measure μ, $\{\mathcal{K}_{x,j}\}_{x\in\mathcal{X}.j\in J}$is a sequence of closed subspaces of $\mathcal{K}$, $B(\mathcal{H}, \mathcal{K}_{x,j})$ is the collection of all bounded linear operators from $\mathcal{H}$ into $\mathcal{K}_x$. If $\mathcal{K}_{x,j} = \mathcal{H}$ for any $x \in \mathcal{X}, j \in J$, we denote $B(\mathcal{H}, \mathcal{K}_{x,j})$ by $B(\mathcal{H})$.

2010 *Mathematics Subject Classification.* 42C15.
Key words and phrases. Frame, Continuous Frames.
† *Corresponding author.*
Communicated by. Mayur P. Goswami