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Continuous fusion frame and continuous resolution of the identity

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Abstract

Continuous resolution of the identity (CRI) was introduced, a new family of CRI was constructed, and Moreover, a new operator was then defined for two Bessel continuous fusion sequences and accordingly, a number of reconstruction formulas and a family of CRI were obtained.

Keywords: continuous fusion frame, Continuous g-frame, Continuous resolution of the identity.
Mathematics Subject Classification [2010]: 42C15, 42C99

1 Introduction

Frames for Hilbert space were formally defined by Duffin and Schaeffer [4] in 1952 for studying some problems in non-harmonic Fourier series. Continuous frames were proposed by G. Kaiser [8] and independently by Ali, Antoine, and Gazeau [2] to a family indexed by some locally compact space endowed by a Radon measure. Abdollahpour and Faroughi [1] introduced the concept of continuous g-frames as a generalization of discrete g-frames. Throughout this paper, (Ω, μ) is a measure space, H and K are two Hilbert spaces, and $\{K_\omega\}_{\omega\in\Omega}$ is a sequence of closed Hilbert subspaces of K. For each $\omega \in \Omega$, $\mathcal{B}(H, K_\omega)$ is the collection of all bounded linear operators from H to K_ω. We also denote

$$\bigoplus_{\omega\in\Omega} K_\omega = \left\{ \{g_\omega\}_{\omega\in\Omega} : g_\omega \in K_\omega \quad \text{and} \quad \int_\Omega \|g_\omega\|^2 d\mu(\omega) < \infty \right\}$$

Definition 1.1. A sequence $\mathbf{\Lambda} := \{\Lambda_\omega \in \mathcal{B}(H, K_\omega) : \omega \in \Omega\}$ is called a continuous g-frame for H with respect to $\{K_\omega\}_{\omega\in\Omega}$, if

1. for each $f \in H$, $\{\Lambda_\omega f\}_{\omega\in\Omega}$ is strongly measurable,
2. there are two constants $0 < A \le B < \infty$ such that

$$A\|f\|^2 \le \int_\Omega \|\Lambda_\omega f\|^2 d\mu(\omega) \le B\|f\|^2; \qquad (f \in H). \tag{1}$$

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