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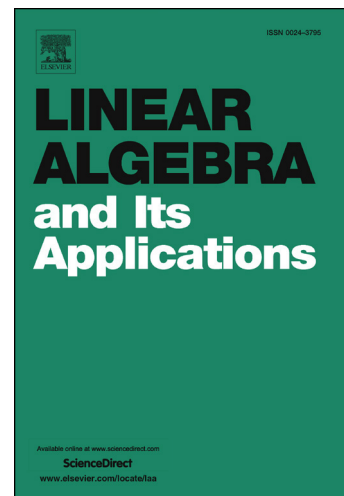
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Frames of Uniform Subframe Bounds With Applications to Erasures[☆]

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Abstract

We introduce a class of frames, called USB frames (frames of uniform subframe bounds), which mean that any subsequence of the frame is a frame for the subspace it spans and the frame bounds depend only on the cardinality of the subsequence. We give several necessary and sufficient conditions for a frame to be a USB frame. As an application, we show that a tight USB frame is optimal for erasures in the sense that the reconstruction error is independent of the position of erasures. We give several explicit construction of USB frames.

Keywords: USB frames; Erasures; Optimal frames.

2000 MSC: 42C15, 46C05.

1. Introduction

A sequence of vectors $\{\varphi_i : 1 \leq i \leq N\}$ in a Hilbert space \mathcal{H} is said to be a frame if there exist positive constants A and B such that

$$A\|f\|^2 \leq \sum_{i=1}^N |\langle f, \varphi_i \rangle|^2 \leq B\|f\|^2, \quad \forall f \in \mathcal{H}.$$

The frame theory is a useful tool and is widely used in signal and image processing. We refer to [7, 8, 14] for more details on frames.

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