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Thesis Title: Sampling in Band-Limited and Shift-Invariant Spaces

Abstract

Sampling and reconstruction of signals is an important topic in mathematical signal processing. The introduction of frames into such problems gives new interpretation of this area. Many new and effective algorithms are based on this new approach. In this work, the theory of the frame-based algorithms is reviewed and several algorithms are compared. More precisely, we first discuss the concepts of band-limited spaces and shift-invariant spaces as well as certain frames constructed in such spaces. The various reconstruction algorithms are then given and analyzed, especially the algorithms used in band-limited and shift-invariant spaces. The relations of different algorithms given in these two spaces are compared. Moreover, numerical experiments are carried out in order to give a more direct illustration of the algorithms.

Keywords:

Band-limited Space, Frame, Reconstruction Algorithms, Sampling, Shift-invariant Space, Toeplitz matrix