Department of Mathematical Sciences
Sabbatical Presentation

"Cross Frame Potential and Frame Design"
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Thursday, March 21, 2024
1:00-1:50 p.m.
RB 450

Abstract:

The notion of a frame for a Hilbert space H is a generalization of the notion of a basis for H. In general, a frame will have infinitely many dual frames—while a basis has a unique dual basis. As a result, frames provide stable and redundant representations of elements in Hilbert spaces, a feature that offers significant advantages in numerous applications eg. protection against data loss with signal transmission.

We explore the cross-frame potential of a frame F, which appraises the cross correlation between F and any of its duals. We determine what information the cross-frame potential value can reveal about the relationship between a frame and its dual, and open the question of custom-design of dual frame pairs which have a certain cross-frame potential value. This motivates the following pursuit: Given a frame F, we study the existence and structure of a dual frame that satisfies certain constraints. We state the conditions under which a dual frame can include imposed directions, and specify the terms that warrant a recovery of the desired dual.