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Frame-type systems

Frames, which intuitively (but not quite accurately) are thought of as "over complete bases in Hilbert spaces", have created much interest over the past 20 years. Unfortunately, there are some settings in which it is quite difficult, if not imposable, to build a system which on one hand satisfies some structural requirements and on the other hand is a frame.

In this talk a quasi-frame type of systems will be introduced. Roughly speaking, these are complete systems with an additional property - the coefficients of the approximating linear combinations are, in some sense, controlled. We will discuss two results concerning this concept.

1.It is known that a family of translates of a single function can never be a frame in $L^2(\mathbb{R})$. We construct a system of translates, with a sparse set of translations, which satisfies the frame-type approximation property described above.

This is a joint work with A.M.Olevskii.

2. We establish Balian-Low type Theorems for complete and minimal Gabor systems with the same type of approximation property. The scale of systems which we consider, enable us to present a continuous interpolation, between the classical Balian-Low theorem for Riesz bases and its extension for complete and minimal systems. Moreover, this interpolation is extended to the non-symmetric generalization of these theorems.

This is a joint work with J-.F.Olsen.