

# SEMINARIO DE ANÁLISIS Y APLICACIONES

Viernes, 14 de abril de 2023

10:00 h., Módulo 17 - Aula 320 (Depto. Matemáticas UAM)

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Fourier multipliers, function expansions and reproducing formulas associated to GTI systems

## Resumen:

For a given pair of frames  $\{\psi_n\}$  and  $\{\varphi_n\}$  in a separable Hilbert space  $\mathcal{H}$ , the associated mixed frame operator  $S : \mathcal{H} \rightarrow \mathcal{H}; f \mapsto \sum_n \langle f, \psi_n \rangle \varphi_n$  is a bounded linear operator. In this talk, we discuss a characterization result for the mixed frame operator to be a Fourier multiplier which concerns a concept at the core of frame theory, namely, the reproducing formulas for frame pairs  $\{\psi_n\}$  and  $\{\varphi_n\}$  in  $\mathcal{H}$ . The result turned out to be not only interesting in itself, but also important for further investigations. We discuss some properties of  $S$  and apply the obtained characterization to investigate reproducing (reconstruction) property when  $\{\psi_n\}$  and  $\{\varphi_n\}$  belong to generalized translation-invariant (GTI) systems, a special class of structured frame systems motivated by the utility of a recent notion considered in (2-4). The concept of orthogonality plays a significant role in multiplexing techniques and in the synthesis of such frames, in this context, by utilizing the unitary extension principle of Christensen and Goh (1), we give a general construction for orthogonal GTI frame pairs in LCA group setting and derive explicit constructions for the B-splines generated frames.

## References

- (1) O. Christensen and S. S. Goh, *The unitary extension principle for locally compact abelian groups with co-compact subgroups*. Proc. Amer. Math. Soc. 149(3) (2021), 1189-1202.
- (2) J. W. Iverson, *Subspaces of  $L^2(G)$  invariant under translation by an abelian subgroup*. J. Funct. Anal., 269(3) (2015), 865-913.
- (3) M. S. Jakobsen and J. Lemvig, *Reproducing formulas for generalized translation invariant systems on locally compact abelian groups*. Trans. Amer. Math. Soc., 368 (2016), 8447-8480.
- (4) J. Lemvig and J. T. van Velthoven, *Criteria for generalized translation-invariant frames*. Studia Math., 251(1) (2020), 31-63.

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