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Frame Multipliers, Applications and Inversion

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The frame concept extends the concept of orthonormal basis. Still, a frame for a Hilbert space H guarantees perfect reconstruction of all the elements in H , but contrary to orthonormal bases, the frame elements can be redundant. The redundancy is however crucial in certain applications and this makes frames very appropriate for applications where bases are not suitable or not applicable at all. Nowadays frames are essential for signal and image processing and find applications in many fields.

Frame multipliers are operators determined by two frames and one scalar sequence (mask). More precisely, the action of a multiplier on a signal can be described as follows: analysis of the signal via a frame (leading to a scalar sequence), multiplication of the resulting scalar sequence with the mask (aiming a desired modification of the signal), and synthesis via a frame (leading to a modified signal). Multipliers have been implicitly used in applications for a long time and in the recent decades they have become of interest for theoretical investigation, especially in relation to frames.

In this talk, we will first briefly introduce frames and frame multipliers. Then we will discuss some applications in signal processing. Finally, we will present some results on inversion of frame multipliers.