

Inversion of Gabor Frame Multipliers

Diana Stoeva

Faculty of Mathematics, University of Vienna

The frame concept extends the concept of an orthonormal basis. It allows redundancy and still guarantees a possibility for stable reconstruction of the elements in a Hilbert space, which is of crucial importance for some applications. In signal processing, frames determined by translated and modulates of a single function (so called Gabor frames) are very useful. Involved in frame multipliers, they are applied for example for signal modifications in psychoacoustics, music, and other fields. Frame Multipliers are operators that are determined via two frames and one complex scalar sequence, and consist of three stages: analysis of a signal via a given frame (samples of the signal through the frame elements resulting in a scalar sequence), multiplication/masking stage (multiplication of the samples with a given complex scalar sequence), and synthesis via a second given frame (leading to a modified signal). For applications as well as from a theoretical point of view, after modifying a signal it is also of interest to be able to return to the original signal. Thus, investigation of invertibility of multipliers is of interest. In this talk, first we recall some results concerning sufficient conditions for invertibility of frame multipliers and formulas for the inverses (joint work with Peter Balazs) and then we focus on the specific case of Gabor frame multipliers (joint work with Jerielle Malonzo). The speaker acknowledges support from the Austrian Science Fund (FWF) through Project P 35846-N “Challenges in Frame Multiplier Theory”, grant DOI 10.55776/P35846.

In Special Session 1 on Applied Harmonic Analysis and Operator Theory at the Mathematical Congress of the Americas 2025.