Formulas for inversion of frame multipliers

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Frames for Hilbert spaces extend orthonormal bases allowing redundancy and still provide perfect and stable reconstruction. This makes them very useful for many real-life applications, e.g. in signal and image processing. In signal processing, frame multipliers can be seen as a particular way to implement time-variant filters. Theoretically, they can be described as operators which combine analysis of a signal via a frame, modification of the obtained coefficients via a scalar sequence, and synthesis via a (possibly different) frame leading to a modified signal. They can also be seen as a generalization of frame operators, but in contrast to frame operators, which are always invertible, multipliers may fail the invertibility property. In this talk, first we briefly recall the concepts of frame and frame multiplier. Then we give an overview on the investigation of inversion of multipliers during the last years, focusing on the following points: sufficient conditions for invertibility; formulas for the inverses aiming efficient computations; representation of the inverses as multipliers with specific form, motivated by the formula valid in the case of non-redundant frames. References are given for further details on the topics. The talk is based on a joint work with Peter Balazs.