

# Stability of Persistent Homology and Frame Analysis

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A basic task in signal analysis is to characterize data in a meaningful way for analysis and classification purposes. Time-frequency transforms are powerful strategies for signal decomposition, and important recent generalizations have been achieved in the setting of frame theory. In parallel recent developments, tools from algebraic topology, traditionally developed in purely abstract settings, have provided new insights in applications to data analysis. In this report, we investigate a particular interaction of the fundamental stability property of persistent homology with frame analysis, both from theoretical and experimental points of view. The motivation is to design new signal analysis methods by combining the strength of frame theory as a basic signal processing concept, with persistent homology as a new tool in data analysis.