Abstract

Let $\{f_j\}$ be a Parseval frame for a Hilbert space H, or more generally $\{f_j, g_j\}$ be a dual pair of frames. Let f be a vector in H, and let Λ be a subset of the index set. If f is analysed with $\{g_j\}$ and if the frame coefficients for Λ are erased or omitted, then by bridging the erasures we mean replacing the erasured coefficients with appropriate weighted averages of the other non-erasured coefficients. By spectral bridging we mean bridging in such a way that the resulting error operator has significantly reduced spectral radius. We show that in many (in fact most) cases bridging can be done to make the error operator nilpotent, so the spectral radius is zero, using a bridge set of indices no greater than the cardinality of the erasure set. In fact, the error operator can be made nilpotent of index 2, leading to a new method of perfect reconstruction from frame erasures in a small number of computational steps, and to improved partial reconstruction when perfect reconstruction is not the goal.