OPTIMAL SQUARED–ERROR SIGNAL RECOVERY FROM NONIDEAL SAMPLES (MonPmOR7)

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✱ Abstract :   We treat the problem of reconstructing a signal from its non–ideal samples where the sampling and reconstruction spaces as well as the class of input signals can be arbitrary subspaces of a Hilbert space. If the signal is known to lie in an appropriately chosen subspace, then we propose a method that achieves the minimal squared–error approximation. In the general case, we show that the minimal–error reconstruction cannot usually be obtained. Instead, we suggest minimizing the worst–case squared–error between the reconstructed signal, and the best possible (but usually unattainable) approximation of the signal, over all signals that yield the given samples. Interestingly, the optimal method turns out to be linear, and coincides with a recently proposed suboptimal approach for this problem.

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