orthogonal in OOMP, MGS and RMGS (explicit computation for the first two algorithms and only implicit for RMGS),


It was shown in particular in this paper that some methods often referred as different techniques in the literature are equivalent. The merit of the different methods was studied in terms of complexity and performances and it is clear that some approaches realize a better trade-off between these two facets. As an example, the RMGS provides substantial gain in performance to the standard MP algorithm with only a very minor complexity increase. Its main interest is indeed the use of a dictionary that is iteratively orthogonalized but without explicitly building that dictionary. On the other end, for application where complexity is not a major issue, CMP based algorithms represent an excellent choice, and especially the newly introduced CyOOCMP.

The cyclic algorithms are compared to the other non-greedy procedures, i.e. COSAMP, Subspace Pursuit and $L_1$ minimization. The proposed Cyclic Complementary OOMP successfully competes with these algorithms in solving the sparse and non-sparse problems of small dimension (encountered e.g. in CELP speech coders).

Although it is not discussed in this paper, it is interesting to note that the efficiency of an algorithm may be dependent on how the dictionary $F$ is built. As noted, in the introduction, the dictionary may have an analytic expression (e.g. when $F$ is an union of several transforms at different scales). But $F$ can also be built by machine learning approaches (such as K-means [10], K-SVD [37] or other clustering