

## **Robust and Fast Subspace Recovery**

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Consider a dataset of vector-valued observations that consists of a modest number of noisy inliers, which are explained well by a low-dimensional subspace, along with a large number of outliers, which have no linear structure. We first describe a convex optimization problem that can reliably fit a low-dimensional model to this type of data. When the inliers are contained in a low-dimensional subspace we provide a rigorous theory that describes when this optimization can recover the subspace exactly. We present an efficient algorithm for solving this optimization problem, whose computational cost is comparable to that of the non-truncated SVD. We also show that the sample complexity of the proposed subspace recovery is of the same order as PCA subspace recovery and we consequently obtain some nontrivial robustness to noise. At last, we discuss modifications of this convex strategy to obtain some computational advantages. This presentation is based on joint works with various collaborators.