

Restricted eigenvalue property for corrupted Gaussian designs

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Motivated by the construction of robust estimators via convex relaxations, known to be computationally efficient, we present conditions on the sample size which guarantee an augmented notion of Restricted Eigenvalue-type condition for Gaussian designs. Such notion is suitable for the construction of robust estimators of a multivariate Gaussian model whose samples are corrupted by outliers. Our proof relies on simultaneous lower and upper bounds of two different random bilinear forms balancing the interaction between the parameter and corruption vectors. We thus do not rely on extreme singular values bounds nor on the use of a mutual incoherence property. An important theoretical and practical consequence of such approach is that a sharper restricted eigenvalue constant can be obtained and the sparsity levels of the unknown parameter and corruption vectors are allowed to be completely independent of each other.

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