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Agnostic Estimation of Mean and Covariance

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ABSTRACT

In this talk, we consider the problem of estimating the mean and covariance of a distribution from iid samples in $\mathbb{R}^n$, in the presence of an $\eta$ fraction of malicious noise; this is in contrast to much recent work where the noise itself is assumed to be from a distribution of known type. We will give polynomial-time algorithms to compute estimates for the mean, covariance and operator norm of the covariance matrix, and show that the dimensional dependence of the error is optimal up to a $O(\sqrt{\log n})$ factor. This gives polynomial-time solutions to some of the questions studied in robust statistics. As one of the applications, this immediately enables one to do agnostic SVD.

This is a joint work with Kevin Lai and Santosh Vempala.