

SINGULAR VALUES AND VECTORS UNDER RANDOM PERTURBATION

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ABSTRACT. Computing the singular values and singular vectors of a large matrix is a basic task in high dimensional data analysis with many applications in computer science and statistics. In practice, however, data is often perturbed by noise. A natural question is the following. How much does a small perturbation to the matrix change the singular values and vectors?

Classical (deterministic) theorems, such as those by Davis–Kahan, Wedin, and Weyl, give tight estimates for the worst-case scenario. In this talk, I will consider the case when the perturbation is random. In this setting, better estimates can be achieved when our matrix has low rank. This talk is based on joint work with Van Vu and Ke Wang.

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