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Title: Learning Noisy Rank-One matrices: Bayes, Non-Bayes, and Large Deviations

**Abstract:** We introduce a universality result that reduces the mutual information for inference problems in the mismatched setting to the computation of a modified SK free energy. In the Bayesian optimal setting, the modified SK free energy is identical to the one from low rank matrix factorization. We prove an almost sure large deviations principle for the overlaps between the truth and estimators in both the Bayesian optimal and mismatched setting. As a consequence, we recover the limit of the mutual information in mismatched inference problems. This is upcoming work with Alice Guionnet, Florent Krzakala, and Lenka Zdeborova.