1158-05-318 **Theo McKenzie*** (mckenzie@math.berkeley.edu), **Hermish Mehta** and **Luca Trevisan**. *A New Algorithm for the Robust Semi-Random Independent Set Problem.*

We study the independent set problem in a semi-random model proposed by Feige and Kilian. This model selects a graph with a planted independent set of size $k$ and then allows an adversary to modify a large fraction of edges: the subgraph induced by the complement of the independent set can be modified arbitrarily, and the adversary may add edges from the independent set to its complement. In particular, the adversary can create a graph in which the initial planted independent set is not the largest independent set. Feige and Kilian presented a randomized algorithm, which with high probability recovers an independent set of size $k$ when $k = \alpha n$ where $\alpha$ is a constant, and the probability of a random edge $p > (1+\epsilon)\ln n/\alpha n$. We give a new deterministic algorithm in the Feige-Kilian model that finds an independent set of size at least $.99k$ provided that the planted set has size $k = \Omega(n^{2/3}/p^{1/3})$, and finds a list of independent sets, one of which is the planted one provided that $k = \Omega(n^{2/3}/p)$. This improves on the algorithm of Feige and Kilian by working for smaller $k$ if $p = \Omega(1/n^{1/3})$. The ability to find a good approximation of the largest independent set is new when $p < \ln n/k$. (Received March 03, 2020)