1100-41-35 **Mark Iwen*** (iwenmark@msu.edu), Department of Mathematics, Michigan State University, 619 Red Cedar Road, East Lansing, MI 48824, and **Felix Krahmer**. *Fast Subspace Approximation via Greedy Least-Squares.*

I will discuss fast and deterministic dimensionality reduction techniques for a family of subspace approximation problems. Let $P \subset \mathbf{R}^N$ be a given set of M points. The techniques discussed find an $O(n \log M)$-dimensional subspace that is guaranteed to always contain a near-best fit n-dimensional hyperplane $\mathcal{H}$ for P with respect to the cumulative projection error $\left(\sum_{\mathbf{x} \in P} \|\mathbf{x} - \Pi_{\mathcal{H}} \mathbf{x}\|_2^p\right)^{1/p}$, for any chosen $p > 2$. The deterministic algorithm runs in $\tilde{O}\left(MN^2\right)$-time, and can be randomized to run in only $\tilde{O}\left(MNn\right)$-time while maintaining its error guarantees with high probability. In the case $p = \infty$ the dimensionality reduction techniques can be combined with efficient algorithms for computing the John ellipsoid of a data set in order to produce an n-dimensional subspace whose maximum ℓ_2-distance to any point in the convex hull of P is minimized. The resulting algorithm remains $\tilde{O}\left(MNn\right)$-time. (Received February 07, 2014)