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MADALGO seminar by Eric Price,
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Lower Bounds in Compressed Sensing

Abstract:

Compressed sensing is a method for reconstructing a sparse signal from a low-rank linear sketch. This is useful because many real-world signals have sparse representations in some basis; for example, images are sparse in the wavelet basis and music is sparse in the Fourier basis.

In the past five years, a variety of sketch matrices and reconstruction techniques have emerged that can efficiently and stably recover an N-dimensional vector with K non-zero components from $O(K \log N/K)$ linear measurements.

We prove that any stable recovery scheme requires $\Omega(K \log N/K)$ linear measurements, matching the upper bound. This contrasts with the $\Theta(K)$ measurements required for unstable recovery.

Joint work with:

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