

APPLIED MATHEMATICS COLLOQUIUM

Compressive Sampling and Redundancy

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Abstract:

Compressive sampling (CoSa) is a new and fast-growing field which addresses the shortcomings of traditional signal acquisition. Many methods in CoSa have been developed to reconstruct a signal from few samples when the signal is sparse with respect to some orthonormal basis. This talk will introduce the field of CoSa and present new results in compressive sampling from under sampled data for which the signal is not sparse in an orthonormal basis, but rather in some arbitrary dictionary. We will highlight numerous applications to which this framework applies and interpret our results in these settings. Since the dictionary need not even be incoherent, this work bridges a gap in the literature by showing that signal recovery is feasible for truly redundant dictionaries. We show that the recovery can be accomplished by solving an ℓ_1 -analysis optimization problem, and that the condition we impose on the measurement matrix which samples the signal is satisfied by many classes of random matrices. We will also show numerical results which highlight the potential of the ℓ_1 -analysis problem.

Monday March 14th 2011

4:30 PM

Building 2, Room 105

*Refreshments are available in Building 2, Room 290
(Math Common Room) between 3:30 – 4:30 PM*

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