PHASELESS RECONSTRUCTION VIA ANGULAR SYNCHRONIZATION

AFONSO BANDEIRA (PRINCETON UNIVERSITY)

In many applications, an unknown vector is measured according to the magnitude of its inner product with some known vectors. It is desirable to design an ensemble of vectors for which any unknown vector can be recovered from such measurements. This measurement process is known to be injective for generic M-dimensional vector ensembles of size at least 4M-2. Recently, semidefinite programming was used to stably reconstruct from measurements with random ensembles of size O(MlogM). In this talk, we use the polarization identity, spectral graph theory and new developments in angular synchronization to efficiently and stably recover from phaseless measurements with specific ensembles of size O(M). The angular synchronization problem consists of estimating a set of unknown angles (or higher dimensional rotations) from noisy measurements of a subset of the pairwise ratios. We will conclude by presenting a Cheeger-like inequality that relates how well it is possible to solve this problem with the spectra of an operator, the graph connection Laplacian.