Math 278B - Mathematics of Information, Data, and Signals Seminar

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Recovery of sparse signals from their Fourier coefficients

Abstract:

In this talk, we study a new recovery procedure for non-harmonic signals, or more generally for extended exponential sums $y(t)$, which are determined by a finite number of parameters. For the reconstruction we employ a finite set of classical Fourier coefficients of $y(t)$. Our new recovery method is based on the observation that the Fourier coefficients of $y(t)$ possess a special rational structure. We apply the recently proposed AAA algorithm by Nakatsukasa et al. (2018) to recover this rational structure in a stable way. If a sufficiently large set of Fourier coefficients of $y(t)$ is available, then our recovery method automatically detects the correct number of terms $M$ of the exponential sums $y(t)$ and reconstructs all unknown parameters of the signal model. Our method provides a new stable alternative to the known numerical approaches for the recovery of exponential sums that are based on Prony’s method.

These results have been obtained jointly with Markus Petz and Nadiia Derevianko.

Host: Rayan Saab

Thursday, June 3, 2021
11:30 AM
Zoom link:
https://msu.zoom.us/j/96421373881
(passcode: first prime number $> 100$)