Sublinear-Time Fourier Algorithms

Sina Bittens*

In 2010, M.A. Iwen (in Found. Comput. Math., 10(3):303-338, 2010) introduced a deterministic combinatorial sublinear-time Fourier algorithm for estimating the best k term Fourier representation for a given frequency sparse signal, relying heavily on the Chinese Remainder Theorem and combinatorial concepts. In 2016, a different deterministic sublinear Fourier algorithm for input signals with small support length was proposed, which employs periodizations of the signal and requires that the signal length is a power of 2 (Plonka and Wannenwetsch in Numerical Algorithms, 71(4):889-905, 2016).

In this talk we will use Iwen's idea to develop an algorithm for the case of an input function with small support length, combining the Chinese Remainder Theorem approach for arbitrary sparse signals with the structure given by the small support. This reduces the runtime of the algorithm as the effortful combinatorial part can be omitted.

*Institute for Numerical and Applied Mathematics, University of Göttingen