Fast Spectral Reconstruction of Noisy, Sparse Time Domain Data through Iterative Projections ZACHARY SETHNA, Princeton University, Physics Dept., MERIDETH FREY, SEAN BARRETT, Yale University, Physics Dept., SUVRAJIT SENGUPTA, KURT ZILM, Yale University, Chemistry Dept. — We discuss here an approach for reconstructing spectra from sparse time domain data, by way of iterated projections, and more specifically by alternating projections or by use of the difference map algorithm developed by Veit Elser. This is done in a purely deterministic way, by reformulating any a priori knowledge or constraints into projections, and then iterating. This method is extremely flexible, can be applied to a variety of different signals, and is robust enough to handle real data (with noise and artifacts). In this talk we explain the motivation behind this approach, the formulation of the specific projections, and various methods for handling noise. We will demonstrate the approach using 2D NMR spectra and will compare and contrast this approach with existing methods, such as Maximum Entropy reconstruction.

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