ACMS Applied Math Seminar

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Thursday, November 21, 2019
154 Hurley Hall
3:30 - 4:30 P.M.

A Supervised Learning Problem and Compressed Sensing

Learning the underlying process from a finite set of input-output observations is an important but challenging task in various scientific disciplines. The learned model will then be helpful to study the mathematical fundamental of the learning process and to make future predictions. In general, this data-based learning problem is ill-posed due to the nonlinearity of the unknown function and the complicated properties of given data. One of the main directions is to investigate the sparsity-of-effect in the data-driven methods to select a suitable model. Along this direction, we study the problem of learning nonlinear functions from various types of data ranging from independent to weakly dependent data. We provide a reconstruction guarantee for the associated l1-optimization problem, given that the data is bounded and satisfies a suitable concentration inequality. When the amount of given data is limited, especially in high dimensional spaces, we propose a sampling strategy to guarantee a reconstruction. This is joint work with Rachel Ward (UT Austin), Hayden Schaeffer (CMU), and Lam Ho (Dalhousie University).