Approximate Message Passing Algorithms for High-dimensional Statistical Estimation in Image Processing

Cynthia Rush, Columbia University

Approximate Message Passing or AMP is a class of low complexity, scalable algorithms used to solve high-dimensional noisy linear regression problems where the goal is to estimate a vector x from a noisy measurement y = Ax + noise. AMP has the attractive feature that its performance, measured for example by the squared error loss, can be tracked accurately by a scalar iteration referred to as state evolution. In this talk, I will present recent performance guarantees for analysis of this algorithm under various problem conditions and I will discuss applications in statistical inference and estimation used for image processing.