Approximate Message Passing Algorithms for High-dimensional Statistical Estimation in Image Processing
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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 $y = Ax + \text{noise}$. 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.