

Abstract: A theoretical justification for high-dimensional statistical methods, including the lasso, has mainly been provided by a 'non-asymptotic analysis.' This framework typically uses some concentration inequalities to derive 'nonasymptotic' estimation error bounds under the assumption that the models are sufficiently sparse. In this presentation, I will review a quite different framework for 'asymptotic analysis' of high-dimensional problems that is based on the approximate message passing (AMP) algorithm. Specifically, I will focus on a high-dimensional linear regression model (that is not necessarily sparse) and its lasso estimator, and show how to derive its exact limiting behavior using the AMP.