



THE UNIVERSITY OF
CHICAGO

Department of Statistics

STATISTICS COLLOQUIUM

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Mean Field Variational Inference:
Computational and Statistical Guarantees

MONDAY, February 5, 2018 at 4:30 PM

Eckhart 133, 5734 S. University Avenue
Refreshments before the seminar at 4:00PM in Jones 111

ABSTRACT

The mean field variational inference is widely used in statistics and machine learning to approximate posterior distributions. Despite its popularity, there exist remarkably little fundamental theoretical justifications. The success of variational inference mainly lies in its iterative algorithm, which, to the best of our knowledge, has never been investigated for any high-dimensional or complex model. In this talk, I will describe the statistics/computation interface of the iterative algorithm of mean field variational inference. I will study it from a frequentist perspective, quantifying it by posterior contraction. For community detection problem, I will show that the iterative algorithm has a linear convergence to the optimal statistical accuracy within $\log n$ iterations. The technique can be extended to analyzing Expectation-maximization and Gibbs sampler with similar guarantees obtained, which I will briefly describe. The community detection problem used in my talk provides a test case and playground, and it is promising to understand mean field under a general class of latent variable models.

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