

STATISTICS COLLOQUIUM

FRIDAY, APRIL 30, 2010

TALK: 4:00 PM — SCIENCE CENTER, ROOM 705

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“Interwoven EM Algorithms”

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ABSTRACT

Since its first appearance in the statistical literature, the EM algorithm has spawned a large number of variants, generalizations and specializations. In this talk we introduce a new class of EM algorithm to accelerate the rate of convergence: the interwoven EM (IEM) algorithm. The fundamental idea of interweaving is to combine two or more different data augmentation schemes into a single efficient algorithm. We prove the optimality of one particular pairing, the ancillary and sufficient augmentations, within a large class of problems.

Our algorithm is the optimization counterpart of the recent interweaving approach for data augmentation. We establish formal connections between both the structure and performance of the sampling and optimization algorithms. IEM is also intimately connected with many other flavors of EM such as parameter-expanded EM and variational EM. By formalizing the connections between IEM and a selection of alternative optimization algorithms, we will attempt to convey some intuition behind interweaving. Examples will be given describing the construction, implementation and performance of the IEM algorithm for both mixed effects models and dynamic linear models. We conclude with ideas for extensions of IEM suggested by this intuition and a general framework for multi-model statistical computation.