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SEMINAR

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October 15, 2009
304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

**FEEDBACK AND WEIGHTING MECHANISMS FOR IMPROVING
JACOBIAN ESTIMATES IN AN ADAPTIVE STOCHASTIC ALGORITHM**

ABSTRACT

Consider the problem of root-finding and/or optimization in the presence of noisy function measurements. It is known that a stochastic analogue of the standard Newton algorithm provides an asymptotically optimal or near-optimal form of search for root-finding or optimization. However, directly determining the required Jacobian matrix (or Hessian matrix for optimization) has often been difficult or impossible in practice. In this talk, we present an adaptive algorithm that is based on a simple method for estimating the Jacobian matrix while simultaneously estimating the primary parameters of interest. Relative to prior methods for adaptively estimating the Jacobian matrix, the talk introduces two enhancements that generally improve the quality of the estimates for underlying Jacobian (Hessian) matrices, thereby improving the quality of the estimates for the primary parameters of interest. The first enhancement rests on a feedback process that uses previous Jacobian estimates to reduce the error in the current estimate. The second enhancement is based on an optimal weighting of per-iteration Jacobian estimates.