



THE UNIVERSITY OF
CHICAGO

Department of Statistics

STATISTICS COLLOQUIUM

RAVI VARADHAN

Division of Biostatistics & Bioinformatics
Johns Hopkins University

Accelerating the Convergence of Monotone Iterations, Including the
EM and MM Algorithms, Using SQUAREM

MONDAY, June 1, 2015, at 4:00 PM
Eckhart 133, 5734 S. University Avenue
Refreshments following the seminar in Eckhart 110.

ABSTRACT

I will start by briefly discussing the classical convergence acceleration technique for scalar sequences called Aitken's extrapolation and a closely related iterative scheme called Steffensen's iteration for finding fixed-points of the function $F(x)$ on the reals. I will discuss the extension of these ideas to vector sequences and functions. Then, I will show how these ideas can be used to accelerate the convergence of EM and MM algorithms. I will present a relatively-recent class of acceleration techniques called SQUAREM (Varadhan and Roland 2008). SQUAREM is simple, stable, and fast. SQUAREM generally achieves superlinear convergence in problems with a large fraction of missing information. Globally convergent schemes are easily obtained by viewing SQUAREM as a continuation of EM. SQUAREM can be readily implemented as an "off-the-shelf" accelerator for any EM-type algorithm as it only requires the EM parameter updating. I will demonstrate the convergence acceleration of SQUAREM with examples. SQUAREM is implemented in an R package called SQUAREM which is available on the Comprehensive R Archive Network (CRAN).