

UCLA Department of Statistics

Thursday, April 26th, 2018 | 1:30pm – 3:30pm
Faculty Center, California Room

2018 De Leeuw Seminar

Examples of MM Algorithms

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This talk will survey the history, theory, and applications of the MM principle introduced to statistics by Jan de Leeuw. The MM principle furnishes a framework for constructing monotone optimization algorithms in high-dimensional models. The MM principle transfers optimization from the objective function to a surrogate function and simplifies matters by: (a) separating the variables of a problem, (b) avoiding large matrix inversions, (c) linearizing a problem, (d) restoring symmetry, (e) dealing gracefully with equality and inequality constraints, and (f) turning a non-differentiable problem into a smooth problem. The art in devising an MM algorithm lies in choosing a tractable surrogate function $g(\mathbf{x} | \mathbf{x}_n)$ that hugs the objective function $f(\mathbf{x})$ as tightly possible. The EM principle from statistics is a special case of the MM principle. Modern mathematical themes such as sparsity, constraint satisfaction, and parallelization mesh well with the MM principle. Sample applications will include robust regression, k -means clustering, averaged and alternating projections, split feasibility algorithms, and sparse eigenvalue estimation.



Kenneth Lange is the Rosenfeld Professor of Computational Genetics. He previously served as chair of both the UCLA Department of Human Genetics and Department of Biomathematics. From 1994 to 1998 he was Professor of Biostatistics and Mathematics and the Pharmacia & Upjohn Foundation Research Professor at the University of Michigan. He has authored four advanced textbooks and published more than 200 scientific papers in the areas of genetic epidemiology, population genetics, membrane physiology, demography, oncology, medical imaging, stochastic processes, and optimization theory. Many of his landmark papers predate by a decade or more the current flood of biological applications of hidden Markov chains, Markov chain Monte Carlo, and high-dimensional optimization.

Reception starts at 1:30pm. Hors d'oeuvres will be served. Seminar starts at 2:00pm.