MANAGEMENT SCIENCES SEMINAR SERIES

Linear Convergence of Stochastic Frank Wolfe Variants

Garud Iyengar
Industrial Engineering and Operations Research
Columbia University

April 14, 2017
2:30–3:30 p.m.

C125 Pappajohn Business Building

Abstract

We show that the Away-step Stochastic Frank-Wolfe Algorithm (ASFW) and Pairwise Stochastic Frank-Wolfe algorithm (PSFW) converge linearly in expectation. We also show that when an algorithm convergences linearly in expectation, it also converges linearly almost surely. In order to prove these results, we develop a novel proof technique based on concepts of empirical processes and concentration inequalities. Such a technique has rarely been used to derive the convergence rates of stochastic optimization algorithms. In large-scale numerical experiments, ASFW and PSFW perform as well as or better than their stochastic competitors in actual CPU time.

This is joint work with Don Goldfarb and Chaoxu Zhou.

About the speaker: Professor Garud Iyengar joined Columbia University's Industrial Engineering and Operations Research Department in 1998. His research interests include convex optimization, robust optimization, queuing networks, combinatorial optimization, mathematical and computational finance, communication and information theory. He has published in numerous journals including IEEE Transactions on Information Theory, Mathematics of Operations Research, Mathematical Programming, IEEE Transactions on Signal Processing, and IEEE Transactions on Communication Theory. He was elected as chairman of the IEOR Department on July 2013.