



LEHIGH
UNIVERSITY

Institute for Data,
Intelligent Systems, and
Computation (I-DISC)



Robot Learning Workshop October 14-15, 2019

Na Li

Harvard University

Distributed Zero-Order Nonconvex Optimization and Extension to Multi-Agent Reinforcement Learning

Abstract: Distributed multi-agent optimization is the core of many applications in distributed learning, control, estimation, etc. Most existing algorithms assume knowledge of first-order information of the objective and have been analyzed for convex problems. However, there are situations where the objective is nonconvex, and one can only evaluate the function values at finitely many points. We consider derivative-free distributed algorithms for nonconvex multi-agent optimization, based on recent progress in zero-order optimization. We develop two algorithms for different settings, provide detailed analysis of their convergence behavior, and compare them with existing centralized zero-order algorithms and gradient-based distribution algorithms. We further develop multi-agent distributed reinforcement learning algorithms based on zero-order optimization algorithms and analyze the convergence.