

Department of Numerical Analysis and Scientific Computing
Simula Research Laboratory
Oslo, Norway

Optimization in Oslo

A Seminar Series on Continuous Optimization

Date:

Wednesday October 11, 2023 at 14:00 (CEST)

Speaker:

Prof. Dr. Michael Ulbrich
Technische Universität München

Title:

A Semismooth Newton Stochastic Proximal Point Algorithm with Variance Reduction

Abstract:

We develop an implementable stochastic proximal point (SPP) method for a class of weakly convex, composite optimization problems. The proposed stochastic proximal point algorithm incorporates a variance reduction mechanism and the implicit SPP updates are computed by applying an inexact semismooth Newton method to a subproblem that is typically small-scale. We establish a convergence theory that takes the inexactness of the SPP steps into account and which is in accordance with existing convergence guarantees of (proximal) stochastic variance-reduced gradient methods. Numerical experiments show that the proposed algorithm compares favorably with other state-of-the-art methods and achieves higher robustness with respect to the step size selection.

This is joint work with Andre Milzarek and Fabian Schaipp.

Brief Bio:

Michael Ulbrich is professor of mathematics and director of the Chair of Mathematical Optimization at the Technical University of Munich (TUM), Germany, since 2006. He currently serves as the Head of the Department of Mathematics and from 2019 to 2022 he was an elected member of the TUM

Senate and the TUM Board of Trustees. Before joining TUM, Michael Ulbrich was a professor at the University of Hamburg (2002-2006). He spent extended research stays at Rice University, Houston, TX in 1996/97 and 1999/2000. In 1996 he received his doctorate and in 2002 his Habilitation at TUM.

Michael Ulbrich's research centers on the theory, numerical methods, and applications of large-scale nonlinear optimization, PDE-constrained optimization and control, stochastic optimization, variational inequalities, and nonsmooth problems. He has published two monographs in the field of PDE-constrained optimization (MOS-SIAM and Springer) and an introductory book on nonlinear optimization (Springer). Michael Ulbrich received the SIAG/CST Best SICON Paper Prize 2021 (with L. Hertlein) and the Howard Rosenbrock Prize 2015 (with M. Simon). He serves as co-Editor-in-Chief of Optimization and Engineering and on the editorial boards of Mathematical Programming Computation, SIAM Journal on Scientific Computing, Journal of Nonsmooth Analysis and Optimization, and Numerical Algebra, Control and Optimization.

For more information, see: <https://www.professoren.tum.de/en/ulbrich-michael>