

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

Optimization in Oslo

A Seminar Series on Continuous Optimization

Date:

Wednesday March 29, 2023 at 14:00 (GMT+1, CET)

Speaker:

Dr. Vyacheslav Kungurtsev
Czech Technical University Prague

Title:

Simultaneous Online Model Identification and Production Optimization Using Modifier Adaptation as a POMDP

Abstract:

A key problem for many industrial processes is to limit exposure to system malfunction. However, it is often the case that control cost minimization is prioritized over model identification. Indeed, model identification is typically not considered in production optimization, which can lead to delayed awareness and alerting of malfunction. In this talk, I will discuss strategies to address the problem of simultaneous production optimization and system identification. In particular, presenting new algorithms based on modifier adaptation and reinforcement learning, which efficiently manage the tradeoff between cost minimization and identification. For two case studies based on a chemical reactor and subsea oil and gas exploration, we show that our algorithms yield control costs comparable to existing methods while yielding rapid identification of system degradation.

Brief Bio:

Slava received the BS degree in Mathematics from Duke University in 2007, and his PhD degree in Mathematics with a specialization in Computational Science from the University of California, San Diego, in 2013. Subsequently, he worked as a postdoctoral fellow at KU Leuven as part of the "optimization for engineering" project. Since 2014 he

has been a postdoctoral and later a key researcher at the Czech Technical University in Prague. His research interests include Mathematical Programming and Numerical Optimization, with applications in Machine Learning and Deep Learning, process control engineering, distributed computing, and uncertainty quantification for mathematical physics.