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

Optimization in Oslo A Seminar Series on Continuous Optimization

Date:

Wednesday December 7, 2022 at 14:00 (GMT+1, CET)

Speaker: **Prof. Dr. Michael Hintermüller Weierstraß Institute & Humboldt-Universität zu Berlin**

Title:

PDE-Constrained Optimization with Learning-Informed Structures

Abstract:

Motivated by applications in optimal control of physics-based processes as well as inverse problems in image processing,

a class of optimization problems with hybrid PDEs is studied. The hybrid form of the state equation stems from combining ab initio

models with data-driven ones. Concerning the latter, artificial neural network (ANN) driven components are particularly in the focus. Moreover,

in this context consequences of the smoothness of the underlying activation functions in ANNs are highlighted. Besides analytical investigations such as existence of solution, stationarity characterizations and approximation behavior, numerical solvers are presented and reports on proof-of-concept numerical tests are provided.

Brief Bio:

Michael Hintermüller holds a Professorship in Applied Mathematics at the Humboldt-Universität zu Berlin and is currently the Director of the Weierstrass Institute of Applied Analysis and Stochastics in Berlin and the spokesperson of the Berlin Mathematics Cluster of Excellence Math+. He is also spokesperson of the Mathematical Research Data Initiative (MaRDI), a consortium with Germany's National Research Data Initiative. MH received his PhD from the Johannes-Kepler-University of Linz in Austria and his habilitation in mathematics from the Karl-Franzens-University of Graz in Austria. He held further positions at Rice University in Texas, USA, and the University of Sussex in the UK. MH's research concentrates on nonsmooth operator equations and variational problems with various applications in the sciences and industry. He is associate editor of several international journals and book series.