Department of Numerical Analysis and Scientific Computing

Simula Research Laboratory

Oslo, Norway

Optimization in Oslo
A Seminar Series on Continuous Optimization

Date:
Wednesday October 4, 2023 at 14:00 (CEST)

Speaker:
Prof. Dr. Sören Bartels
Albert-Ludwigs-University Freiburg

Title:
Error estimates for nonconforming and discontinuous discretizations of nonsmooth problems via convex duality

Abstract:
Various modern applications including image processing and fracture modeling require the use of nondifferentiable functionals. Their numerical solution by standard finite element methods leads to suboptimal convergence rates. The talk discusses the use of nonconforming and discontinuous finite element methods and provides quasi optimal error estimates. These are obtained by using appropriate discrete convex duality relations and identifying suitable regularity conditions. The techniques apply to a large class of convex minimization problems and lead to a postprocessing formula that provides the solution of the discrete dual problem via the nonconforming solution of the discrete primal problem. The discrete approximations give rise to the definition of a primal-dual gap error estimator. Using the particular structure of the discrete dual variable we identify a monotonicity formula that allows us to establish efficiency properties of the estimator for a class of nonlinear Dirichlet problems.

Brief Bio:

Sören Bartels holds the chair for "Applied Mathematics and Its Foundations" at the University of Freiburg, where he has been a full professor since 2012. Before that he was a professor at the University of Bonn 2007-2012 and head of a junior research group at the Humboldt-Universität zu Berlin 2005-2007.

His research interests are in the development and analysis of approximation schemes for nonlinear partial differential equations arising in materials science and geometry. He is the author of three books and over one hundred publications.

For more information, see: https://aam.uni-freiburg.de/agba/index.html?l=en