



Einladung zur öffentlichen Defensio von  
**Morteza KIMIAEI**

Thema der Dissertation

**Unconstrained and bound-constrained optimization in high dimensions**

**Abstract:** There exist many optimization problems with applications in science, engineering, economics, industry, etc. According to whether the exact derivative is available or not, these problems can be classified into two classes: black box optimization (BBO) problems and gradient-based optimization (GBO) problems. It is very important to have algorithms that can be implemented with very little storage for both BBO and GBO problems in high dimensions. This thesis focuses on the design and test of several solvers using subspace techniques to handle BBO and GBO problems in high dimensions. Our solvers are called LMBOPT (for bound constrained GBO problems), VSBBO and STBBO (for unconstrained BBO problems), VSBON (for noisy BBO problems), and LMLS (for unconstrained BBO least-squares problems). Complexity results are investigated for VSBBO and VSBON in the nonconvex, convex, strongly convex cases, and STBBO only in the nonconvex case. To be competitive in comparison with other state-of-the-art BBO and GBO solvers, our solvers use many practical enhancements that do not affect the order of complexity results. A new test environment is constructed to compare the efficiency and robustness of our solvers. It uses an automatic algorithm evaluation, significantly saving the user time, performing statistics, and resulting in a summarized result as pdf/tex file including performance and data profiles.

**Prüfungssenat:**

Univ.-Prof. Mag. Dr. Andreas Cap (Vorsitz)  
(Universität Wien)

o. Univ.-Prof. Dr. Arnold Neumaier  
(Universität Wien )

Prof. Dr. Nikolaos Sahinidis  
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Prof. Dr. Stefano Lucidi  
(Sapienza University of Rome )

**Zeit:** Dienstag, 15. Juni 2021, 16:00 Uhr

**Ort:**

Join Zoom Meeting

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