Talk announcement

Michael Winkler
(RICAM)

Tuesday, June 27, 2023
13:45, S2 416-1

On finding multiple stationary points of nonconvex, box-constrained optimization problems

Design optimization of an electric motor with respect to a certain physical quantity (e.g. the torque) typically gives rise to nonconvex optimization problems. Evolutionary algorithms are able to detect multiple candidates for local solutions of said problems but require a lot of computational effort and are bound to a parametrization of the design domain. A mathematically more rigorous approach in design optimization is density-based topology optimization where the design domain is represented by a density function which is additionally required to fulfil box-constraints. Varying initial guesses when using Newton-like methods to solve these problems may not necessarily lead to more solutions. A technique called 'Deflation' preventing iterative methods to converge to an already found solution and hence opening up space for finding more distinct solutions is introduced. We give an outline on how 'Deflation' may be used in conjunction with Newton's method to solve unconstrained optimization problems and further with a semismooth Newton method to solve simple box-constrained optimization problems.