Nonsmooth optimization and augmented Lagrangian methods

Patrick Mehlitz
BTU Cottbus-Senftenberg, Germany
mehlitz@b-tu.de

In this talk, we demonstrate how the framework of (safeguarded) augmented Lagrangian methods can be used to solve nonsmooth optimization problems in abstract spaces. Two different settings are considered. First, we investigate a fully nonsmooth situation where the involved subproblems can be solved up to approximate global minimality, which is particularly interesting in convex situations, and present numerical examples from image denoising and sparse control. Second, we focus on problems where the nonsmoothness is encapsulated in an objective function of composite type, provide a convergence analysis for the situation where the subproblems are solved up to approximate stationarity, and illustrate our findings by means of numerical examples in the context of low-rank matrix optimization.

Joint work with Alberto De Marchi (University of the Bundeswehr Munich, Germany), Christian Kanzow (University of Würzburg, Germany), Alexander Y. Kruger (Federation University, Australia), Gerd Wachsmuth (BTU Cottbus-Senftenberg, Germany) and Frank Werner (University of Würzburg, Germany).