Parameter Identification in PDEs via Box Constrained Minimization

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The inverse problem of identifying a (possibly distributed) coefficient in a partial differential equation from indirect observations can be written as a constrained minimization problem. Correspondingly, regularization of this inverse problem as well as accounting for measurement noise can be done in an Ivanov an Morozov type fashion by imposing bound constraints on the searched coefficient and on the observation output. This – together with an iterative Gauss-Newton type quadratic approximation procedure – after discretization leads to a convex quadratic program with box constraints. For this class of optimization problems, recently a highly efficient algorithm has been proposed (Hungerländer and Rendl, SIOPT 2015). In this talk we demonstrate performance of this method on some energy based variational formulations of coefficient identification problems in elliptic PDEs.

This is joint work with Philipp Hungerländer and Franz Rendl, Alpen-Adria-Universität Klagenfurt.

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