Convergence and numerical analysis of steepest descent in PDE constrained shape optimization

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We present a general shape optimisation framework based on the method of mappings in the Lipschitz topology. We propose and numerically analyse steepest descent (and Newton-like) minimisation algorithms for the numerical solution of the respective shape optimisation problems. To illustrate our approach we present a selection of PDE constrained shape optimisation problems and compare our findings to results from so far classical Hilbert space methods and recent p-approximations. If time permits we also present a hybrid approach which combines a phasefield approach with our sharp framework.

(joint work with Klaus Deckelnick und Philip Herbert)