On the numerical analysis of nonlinear twofold saddle point problems

Abstract

We provide a general abstract theory for the solvability and Galerkin approximation of nonlinear twofold saddle point problems. In particular, a Strang error estimate containing the consistency terms arising from the approximation of the continuous operators involved is deduced. Then we apply these results to analyse a fully discrete Galerkin scheme for a twofold saddle point formulation of a nonlinear elliptic boundary value problema in divergence form. Some numerical results are also presented.