VERIFIED CALCULATION OF AN ERROR BOUND FOR A SIMPLIFIED ELASTOPLASTICITY MODEL

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We consider a simplified model for nonlinear plasticity. Let $f \in L^2(\Omega)$,

$$S_f = \{\sigma \in (L_2(\Omega))^2 | - \operatorname{div} \sigma = f\}$$

the equilibrium set, and

$$K_f = \{\sigma \in S_f | \ \|\sigma\|_\infty \leq k\}, \ k > 0.$$

Then, the convex minimisation problem to be considered is

$$\min_{\sigma \in K_f} \|\sigma\|^2_{(L_2(\Omega))^2}$$

We will propose a method for enclosing the solution σ when Ω ist a bounded, simply connected, polygonal domain in $\mathbf{R}^2$. If $K_f \neq \emptyset$, there exists a unique solution. If an approximation for it in K_f is known, an error bound can be given in the L^2 norm using duality methods. The main difficulty is the construction of an initial element in K_f.