NUMERICAL SOLUTION OF A NON–SMOOTH EIGENVALUE PROBLEM

ROLAND GLOWINSKI

Department of Mathematics, University of Houston, TX, USA

Abstract. The main goal of this lecture is to discuss the numerical solution of the following non-smooth eigenvalue problem:

$$\inf_{v\in\sum}\int_{\Omega}|\nabla v|dx$$

where Ω is a bounded domain of $\mathbb{R}^2$ and the set $\sum$ is defined by

$$\sum=\{v|v\in H_0^1(\Omega),||v||_{L^2(\Omega)}=1\}.$$

The above infimum (it will be denoted by γ) plays an important role when analyzing the asymptotic behavior of a visco-plastic flow in a cylinder of cross-section Ω. A numerical method for the solution of (NSEVP) will be presented. It combines finite element approximations with an augmented Lagrangian algorithm. The results of numerical experiments will be presented. They show that depending of the shape of Ω one has (with obvious notation)$\gamma_h-\gamma=O(h)$ or $O(\sqrt{h})$.