

### **abstract-Reyes.txt**

**We will discuss on PDE-constrained optimization techniques for the simulation and control of nonsmooth problems arising in fluid mechanics. In particular, the Bingham viscoplastic fluid flow model is investigated. Based on both primal and dual formulations, a regularization strategy for its solution will be presented. For each regularized system, generalized Newton algorithms are constructed. We will present results on global and local superlinear convergence of the algorithms. The use of similar regularizing functions for the flow control problem will also be discussed. This tailored approach allows to derive a sharp optimality system for the original problem and to use semismooth Newton algorithms for its numerical approximation.**