Abstract

The PDE governing the problem of elastoplasticity is linear in the elastic region and nonlinear in the plastic region. In the elastic region, we encounter the problem of elasticity governed by the Navier Lame equations. In the plastic region, we encounter a nonlinear PDE. This PDE is hard to solve numerically and therefore we rewrite the PDE with a penalty parameter ν. It is known that when ν is zero we obtain an exact solution to the problem. This is hard to achieve from a numerical point of view however. When we linearize the PDE with Newton's method, the method fails to converge when ν is small. In this thesis a different method to solve the problem is proposed. This method will help us improve Newton's method by a better choice of the initial guess. We obtain the convergence of this method for ν as close to zero as we want.