

In this thesis we generalize classical Newton's method for non-smooth equations. For this purpose we define the Newton approximation of functions. Then we introduce several methods for solving equations with locally Lipschitz and piecewise smooth functions. We prove that their local convergence rate is Q-superlinear or even Q-quadratic. At the end we apply one of the algorithms to the beam problem with the obstacle. Based on the physical model we establish mathematical model and its discretization. Finally we implement the problem in the MATLAB. Results are summarized in tables.