

This thesis deals with one of the possible different approaches to solving nonlinear optimization problems by conversion to finding non-bounded extrema of function, where constraints are transferred to objective function via penalty function. We will introduce exterior penalty function method and appropriate algorithm for solving this type of problems. The thesis also deals with exact penalty functions, which do not require limit approximation of the penalty parameter to infinity. Then we deal with integer binary nonlinear programming, where several suitable penalty functions are presented to solve this type of problem. In the numerical part, the thesis deals with the minimization of risk at the specified minimum expected return on the sparse portfolio. We observe the effect of changing the penalty parameter on the results of ten different minimization problems calculating risk of sparsity portfolios.