

In this diploma paper we discuss selected optimization methods and mathematical programming models. We focus on optimization models of optimal portfolio selection problem. We consider the problem of finding optimal portfolio under criterion of maximizing expected return and risk minimizing. For selected risk measures we use convenient mathematical models. There are adequate optimization techniques for problems of linear and quadratic programming. For general nonlinear problems we use advanced stochastic optimization algorithms. We numerically illustrate the methods on real data examples using the Mathematica software. Presented results give comparisons both for models and methods. We also focus on computational complexity of optimization algorithms and study the influence of input parameters on the results.