

Stochastic methods are present in our daily lives, especially when we need to make a decision based on uncertain events. In this thesis, we present basic approaches used in stochastic tasks. In the first chapter, we define the stochastic problem and introduce basic methods and tasks which are present in the literature. In the second chapter, we present various problems which are non-linearly dependent on the probability measure. Moreover, we introduce deterministic and non-deterministic multicriteria tasks. In the third chapter, we give an insight on the concept of stochastic dominance and we describe the methods that are used in tasks with multidimensional stochastic dominance. In the fourth chapter, we capitalize on the knowledge from chapters two and three and we try to solve the role of portfolio optimization on real data using different approaches.