

Title: Exponential control of homogeneous Markov processes

Author: Pavol Stanek

Department: Department of Probability and Mathematical Statistics, MFF UK

Supervisor: Mgr. Peter Dostál Ph.D., Department of Probability and Mathematical Statistics, MFF UK

Abstract: This master thesis concerns exponential control of Markov decision chains. An iterative algorithm for finding a control, that maximizes a long term growth rate of expected utility is developed. The utility is measured by exponential utility function. The algorithm is derived for both discrete time and continuous time chain. Subsequently, the results are applied on the problem of optimally managing portfolio with proportional transaction costs. The dynamics of the investor's position is derived and the consequent process is approximated by Markov chain. Using the iterative algorithm, the optimal trading strategy is numerically found.

Keywords: exponential control, Markov chain, portfolio optimization, proportional transaction costs