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Algorithms and Uncertainty

Winter Term 2026/27

Tutorial Session - Week 5

Exercise 1:
We consider the following stochastic decision problem: There are n boxes; box i contains a prize of 1 with probability q_i and is empty otherwise. The game ends when we have found a non-empty box. At each point in time, we can also decide to stop playing. That is, the final prize is either 0 Euros or 1. We can open as many boxes as we like but opening box i costs c_i.

(a) Model this problem as a Markov decision process. In particular, give the state and action sets as well as transition probabilities and rewards.

(b) Find an optimal policy for the case $n = 1$.