
Examination

Theoretical examination

1 QUESTIONS

- Describe the high-level main characteristics of the RL problem given in Assignment 1.
- Define, from the system dynamics f and the reward function r , the components of the "equivalent" MDP. Describe an algorithm to compute these components.
- Define the recurrence equation used to compute $J^\mu(x)$. Provide a bound on $\|J^\mu(x) - J_N^\mu(x)\|_\infty$. Explain through words why this bound is important.
- Describe the Q-Learning algorithm. Under which conditions the sequence of \hat{Q} -functions computed by Q-learning eventually converges?
- What is a contraction mapping? What is a fixed point of a mapping? What can be said about the set of fixed points of a contraction mapping ?
- Describe the three algorithmic models to compute a fixed point of a contraction mapping.
- Prove by using results related to contraction mappings that the Q-learning algorithm converges.
- Give the tabular version of an online Q-learning algorithm with experience replay.