ULiège
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INFO8003-1
Optimal decision making
for complex problems

Evaluation 3

1 QUESTIONS

1. 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?
2. Describe the Q-Learning algorithm. Under which conditions the sequence of $\hat{Q}$-functions computed by Q-learning eventually converges?
3. Prove by using results related to contraction mappings that the Q-learning algorithm converges.
4. What is supervised batch-mode learning? How is Fitted-Q-Iteration related to batch-mode learning?
5. Describe the Fitted-Q-Iteration (FQI) algorithm. Give examples of supervised learning algorithms that can be used inside FQI. Describe situations where the sequences of Q_N-functions computed with FQI (i) can diverge, (ii) converge and (iii) do not converge to the true Q-function but still lead to high quality policies.
6. Give two possible practical stopping conditions for FQI and explain their drawbacks.
7. Can a sequence of Q_N-functions, computed with FQI and tree-based supervised learning, diverge to ∞? If not, provide bounds.