

Announcement WiSe 2024/25

Lecture in Actuarial Science

Mathematics of Reinforcement Learning

Prof. Dr. Christoph Knochenhauer

Area: / Modulnr.: Department Mathematics / CIT413036

Course Structure: Lecture: 4h Exercises: 2h

Content: The course gives an overview of the mathematical foundations of reinforcement learning, including an introduction to Markov decision processes and tabular reinforcement learning methods (Monte Carlo, temporal difference learning, SARSA, Q-Learning, ...). These topics are complemented by an introduction to stochastic approximation theory to the extent of performing a convergence analysis of the algorithms.

Prerequisite: MA0001 Analysis 1, MA0002 Analysis 2, MA0004 Linear Algebra 1, MA0009 Introduction to Probability Theory and Statistics, MA2409 Probability Theory

Literature:
Sutton, Barto (2018): Reinforcement Learning: An Introduction, MIT Press
Puterman (1994): Markov Decision Processes: Discrete Stochastic Dynamic Programming, Wiley
Kushner, Yin (2010): Stochastic Approximation and Recursive Algorithms and Applications, Springer

Certificate: see TUMonline

Location/ Lecture/Exercises: see TUMonline