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Graded Assignment: Graded Assignment: Describe Three MDPs

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✦ AI Grading

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Instructions   **My submission**   Discussions

Describe Three MDPs

Submitted on May 19, 2025

PROMPT

Create an MDP. Remember to describe the states, actions and rewards. Make sure your three MDPs are different from each other.

The Roomba cleaning robot MDP represents a complex decision-making process where the robot must efficiently clean a room while managing its resources. The state space includes the robot's position (x, y coordinates), the cleanliness status of different areas, battery level, and current movement direction. The available actions are moving in four directions, vacuuming, charging, and turning. The reward structure is designed to encourage efficient cleaning: +10 for cleaning a dirty area, +5 for moving to an uncleaned area, -1 for each movement step (energy consumption), -20 for running out of battery, and +15 for completing the entire room. This MDP is particularly interesting because it combines continuous state space (position) with discrete states (clean/dirty areas) and requires the agent to balance immediate cleaning actions with long-term energy management.