Knowledge Checks

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Question 1

1/1 point (graded)

Which two of the following are advantages of policy gradient methods over value-function based methods??

- [x] Policy gradient methods are scalable to problems with high dimensions or continuous state spaces.
- [x] Policy gradient methods can learn stochastic policies.
- [ ] Policy gradient methods converge to the global optimum policy.
- [ ] Policy gradient methods are more sample efficient.

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Correct (1/1 point)

Question 2

1/1 point (graded)

Which reinforcement learning methods does Actor-Critic algorithms combine?? ?

- ( ) Policy gradient algorithms as critics and policy iteration algorithms as actors.
- (•) Policy gradient algorithms as actors and policy iteration algorithms as critics.
- ( ) Discounted returns as actors and policy interaction algorithms as critics.
- ( ) Policy gradient algorithms as actors and expected value functions as critics.

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Correct (1/1 point)

Question 3

1/1 point (graded)

Intuitively, the likelihood ratio method has which two of the following policies?

- [ ] Following the gradient decreases the likelihood of following trajectories with high variance.
- [x] Following the gradient increases the likelihood of finding trajectories with high reward.
- [ ] Following the gradient decreases the likelihood of following trajectories with high bias.
- [x] Following the gradient decreases the likelihood of finding trajectories with low or negative reward.

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Question 4

1/1 point (graded)

Which of the following are properties of the Reinforce algorithm?

- ( ) Uses a policy $\pi(a_t)$ during an episode to collect information on states, actions and rewards.
- ( ) Computes the return for each episode using the rewards collected.
- ( ) Updates the model parameters in the director of the policy gradient.
- (•) All of the above.

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Correct (1/1 point)

Question 5

1/1 point (graded)

Which two of the following are methods to reduce the variance of the REINFORCE algorithm?

- [ ] Use the minimum variance policy gradient to minimize variance of the return.
- [x] Discount returns to encourage trajectories with good actions and discourage trajectories with bad actions.
- [x] Using the discounted expected returns given the policy as a baseline discourages trajectories with return below the baseline.
- [ ] Using the expected returns given the policy as a baseline discourages trajectories with return away from the baseline.

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Question 6

1/1 point (graded)

Which of the following is a correct definition of the advantage function?

- ( ) The difference between the gradient of the log likelihood and the state value function.
- ( ) The difference between the Q-value and the gradient of the log likelihood.
- (•) The difference between the Q-value and the state value function.
- ( ) The difference between the Q-value and the discounted return.

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Question 7

1/1 point (graded)

Which two of the following are the following are advantages of using an N-step Q-value function in an actor-critic algorithm?

- [ ] The N-step Q-value function leads to solutions which maximize the advantage function.
- [x] The N-step Q-value function bootstraps and does not need to sample to the end of an episode to compute an estimate of Q.
- [x] The N-step Q-value function trades off bias for lower variance.
- [ ] The N-step Q-value function trades off variance for lower bias.

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Question 8

1/1 point (graded)

Which two of the following are advantages of the Asynchronous Advantage Actor-Critic (A3C) algorithm when compared to other actor-critic methods?

- [x] Shares parameters between the actor and critic networks to improve data efficiency or speed of training.
- [ ] Eliminates shared parameters between actor and critic networks to improve data efficiency or speed of training.
- [ ] Trains multiple policies on copies of the environment simultaneously improving convergence.
- [x] Trains a single policy by acting on and collecting experience from parallel environments simultaneously to improve scalability.

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