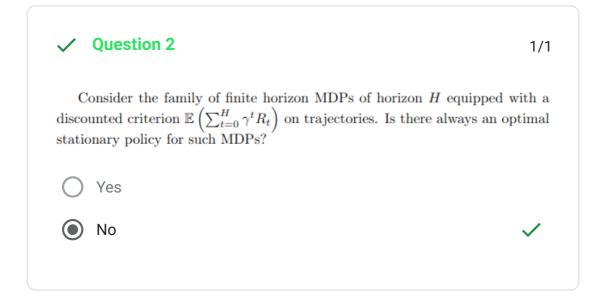
## RL class - quiz on chapter 1

Total des points 3/7 ?

Student last name *	
IGBIDA	
Student first name *	
Rayanne	
X Question 1 How many stationary deterministic memory-less policies are there in an MDP with 5 states and 3 actions?	*0/1
O 8	
5	×
O 15	
O 20	
Bonne réponse	



X Question 3 0/1

An MDP equipped with a policy  $\pi = (\pi_t)_{t \in \mathbb{N}}$  defines a sequence on state random variables  $(S_t)_{t \in \mathbb{N}}$  that is a Markov chain.

True

False

Bonne réponse

True

X Question 4 0/1

Take a finite state space MDP, a stationary, memoryless, stochastic policy  $\pi$  and an initial state distribution  $\mathbb{P}(S_0 = s) = \mu(s)$ . What is the size of the transition matrix  $p^{\pi}$  whose  $p^{\pi}_{ij}$  element is  $\mathbb{P}(s' = s_j | s = s_i)$ ? What is the dependence of  $p^{\pi}_{ij}$  on  $\pi$ , on the transition model p(s'|s,a), on the initial state distribution  $\mu$ ?

X

 $|S| \times |S|$  and  $p_{ij} = \int_A p(s'|s,a) \pi(a|s) da$ 

Option 1

 $|S| \times |A|$  and  $p_{ij} = \int_A p(s'|s,a) \pi(a|s) da$ 

Option 2

 $|S||A|\times |S|$  and  $p_{ij}=\int_A p(s'|s,a)\pi(a|s)\mu(s)dsda$ 

Option 3

 $|S| \times |S|$  and  $p_{ij} = \int_A p(s'|s,a) \pi(a|s) \mu(s) ds da$ 

Option 4Bonne réponse

Option 1

Question 5 \*

1/1

Take a finite state and action space MDP and a fixed policy. Suppose the corresponding Markov chain on states is irreducible and aperiodic. What does  $(p^{\pi})^k$  tend to when  $k \to \infty$ ?

A diagonal matrix

A matrix whose lines are all equal to the stationary distribution

**/** 

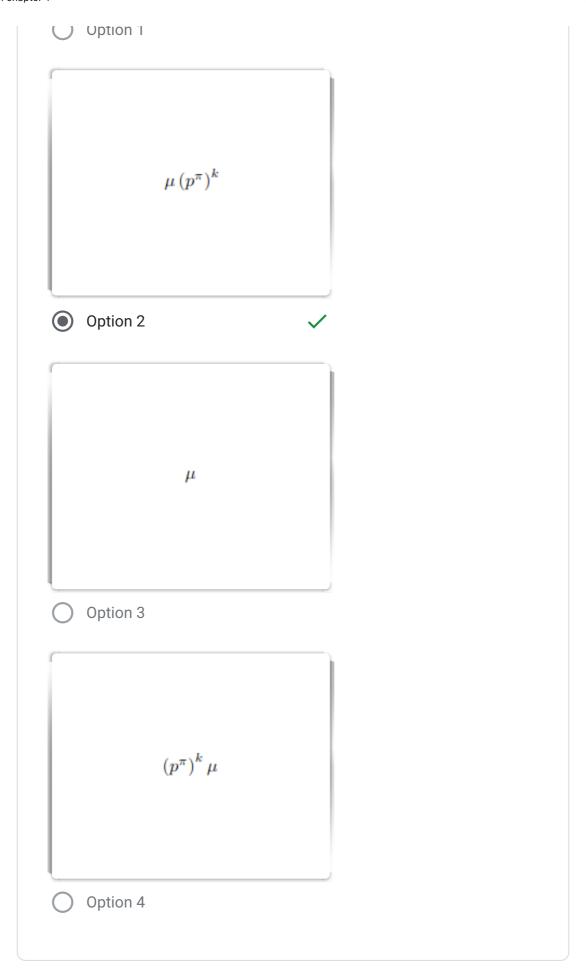
A matrix whose columns are all equal to the stationary distribution

✓ Question 6 \*

1/1

Take a finite state and action space MDP, a fixed policy, and a given probability distribution  $\mu(s)$  on starting states. What is the probability distribution on states after k transitions?

$$\mu\left(\left(p^{\pi}\right)^{k}\right)^{-1}$$



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Take a finite state and action space MDP, a fixed policy, and a given probability distribution  $\mu(s)$  on starting states. Pick the true statement(s) about the state occupancy measure  $\rho_{\mu}^{\pi}$ .

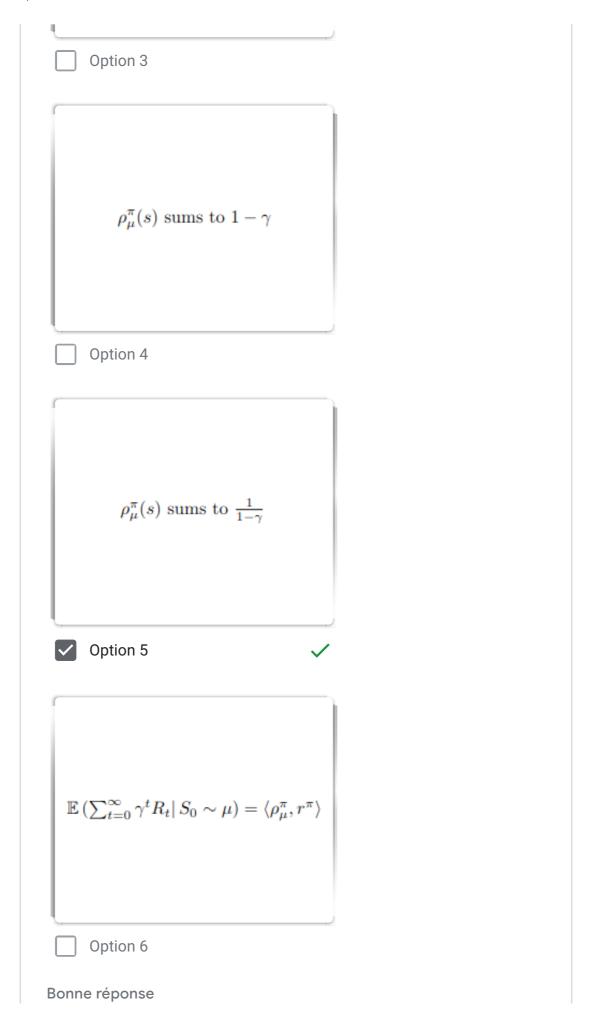
$$\rho_{\mu}^{\pi}(s) = \lim_{t \to \infty} \mu \left( p^{\pi} \right)^{t}$$

Option 1

$$\rho_{\mu}^{\pi}(s) = \sum_{t=0}^{\infty} \gamma^{t} \mu \left(p^{\pi}\right)^{t}$$

Option 2

 $\rho_{\mu}^{\pi}(s)$  sums to 1



Option 2
Option 5
Option 6

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