Hw3

12 de março de 2024 12:53

a) 5 states: $\mathcal{X} = \{1, 2a, 2b, 3, 4\}$

3 actions: $\mathcal{A} = \{a, b, c\}$

4 observations: $\mathcal{Z} = \{1, 2, 3, 4\}$

b)

$$P_a = \begin{array}{c} \\ 1 \\ 2a \\ 2b \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2a & 2b & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 0.5 & 0.5 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix} \end{array}$$

$$P_b = P_c = \begin{array}{c} \\ 1 \\ 2a \\ 2b \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2a & 2b & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 0.5 & 0.5 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix} \end{array}$$

observations

$$O_a = O_b = O_c = \begin{array}{c} \\ 1 \\ 2a \\ 2b \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

actions

$$C = \begin{array}{c} \\ 1 \\ 2a \\ 2b \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{ccc} a & b & c \end{array} \\ \begin{bmatrix} 0 & 0 & 0 \\ 0.5 & 1 & 0 \\ 0.5 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \end{array}$$

c)

$$b_t = \begin{array}{c} \begin{array}{ccccc} 1 & 2a & 2b & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 0.5 & 0.5 & 0 & 0 \end{bmatrix} \end{array}$$

↳ (a)

$$b_{t+1} = b_t P_a = \begin{bmatrix} 0 & 0 & 0 & 0.5 & 0.5 \end{bmatrix}$$

↳ (b) = (c) $= P_c$

$$b_{t+1} = b_t P_b = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \end{bmatrix}$$