

Assignment 5

Due: Mon, Dec 29, 23h59, by email to jaime.cardoso@fe.up.pt

1. Use the HMM depicted in the Figure 1 to work out the following questions.

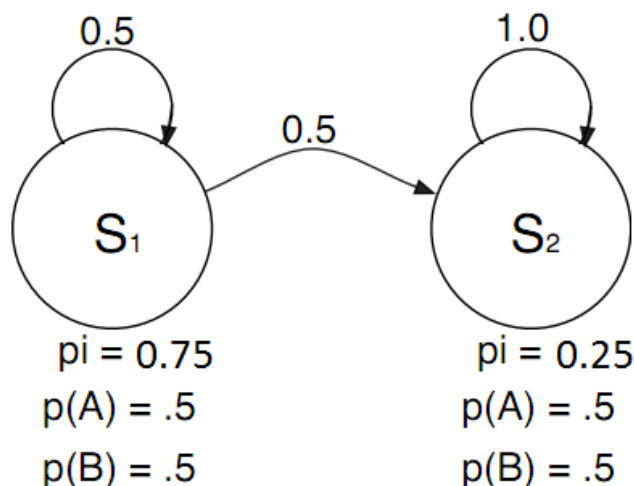


Figura 1: HMM with two states.

- a) In the given HMM, what is the probability that an observation sequence $\{AAB\}$ was generated?
- b) Comment the statement: “Increasing the number of values for the hidden states in an HMM has much greater effect on the computational cost of forward-backward algorithm than increasing the length of the observation sequence.”
2. Consider a HMM with continuous outputs. Assume that the HMM only has two states; both states have the same initial probability; the probability of changing between different states is 0.05 (that is, the transition matrix is symmetric with 0.95 in the elements in the main diagonal). The emission density function for state 1 follows a Gaussian distribution with mean 0 and standard deviation 0.2. For state 2 the emission density function is uniform in $[0, 1]$. Change the code provided in the class (file `hmmTest.m`) to compute the probability of the following sequence of length 10: $\{0.7, 0.7, 0.1, 0.2, 0.3, 0.6, 0.2, 0.3, -0.1, 0.2\}$. Send the modified file and write the computed probability.