Serie: 07

Deadline: 11.05.07 → 08h

Exercise 1

Consider the following *opinion shift table* $N = (n_{jk})$, cross-classifying the attitude of 493 randomly selected Danes towards the EEC in October 1971 (rows $j = 1, \ldots, 3$) by their attitude towards the EEC in December 1973 (columns $k = 1, \ldots, 3$)

$$N = \left(\begin{array}{c|ccc|c} & \text{yes} & \text{no} & \text{undecided} & \text{total} \\ \hline \text{yes} & 167 & 36 & 15 & 218 \\ \text{no} & 19 & 131 & 10 & 160 \\ \text{undecided} & 45 & 50 & 20 & 115 \\ \hline \text{total} & 231 & 217 & 45 & 493 \end{array} \right) \qquad (1)$$

1. Compute the transition matrix P associated to the contingency table N.
2. Compute the stationary distribution π associated to the transition matrix P.
3. Suppose the dynamics of opinion shift in 26 months (= December 1973 minus October 1971) to obey a Markov process with the constant transition matrix P.
   (a) If everybody were initially in favor of the EEC (= "yes"), what is the proportion of people remaining in the YES state after 26 months? After 52 months? In the long run?
   (b) What is the long run uncertainty on the state of a person?
   (c) What is the conditional uncertainty on the state of a person, knowing its state 26 months before?
   (d) *Without doing the computation*, write down the formula giving the conditional uncertainty on the state of a person, knowing its state 52 months before.

Exercise 2

Given an unfair dice with the following probability distribution:

1	2	3	4	5	6
0.12	0.15	0.16	0.17	0.18	0.22

1. Construct a binary Tunstall code with 4 bits.
2. Decode 000011110011
3. Encode 2253
4. This code suffers from a serious problem that makes it practically unusable. Describe this problem. Why does this problem exist and how could it be solved.