TMA4265 Stochastic Processes
Week 39 – Exercises

Exercise 1

Consider a Markov chain with state space $\Omega = 1, 2, 3, 4, 5, 6$ and transition matrix

$$\mathbf{P} = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array} \begin{array}{c} \begin{array}{cccccc} 1 & 2 & 3 & 4 & 5 & 6 \end{array} \\ \begin{pmatrix} 0.5 & 0.5 & 0 & 0 & 0 & 0 \\ 0.25 & 0.75 & 0 & 0 & 0 & 0 \\ 0.25 & 0.25 & 0.25 & 0.25 & 0 & 0 \\ 0.25 & 0 & 0.25 & 0.25 & 0 & 0.25 \\ 0 & 0 & 0 & 0 & 0.5 & 0.5 \\ 0 & 0 & 0 & 0 & 0.5 & 0.5 \end{pmatrix} \end{array}$$

Determine:

a) The equivalence classes.

b) The period of each state.

c) Which states are transient, which are recurrent?

Exercises from the book

4.18, 4.32

Exam question

Do Problem 1 a-c) on the exam of 2008.

`http://www.math.ntnu.no/~mettela/TMA4265V2008/eksamen/TMA4265H2008e.pdf`