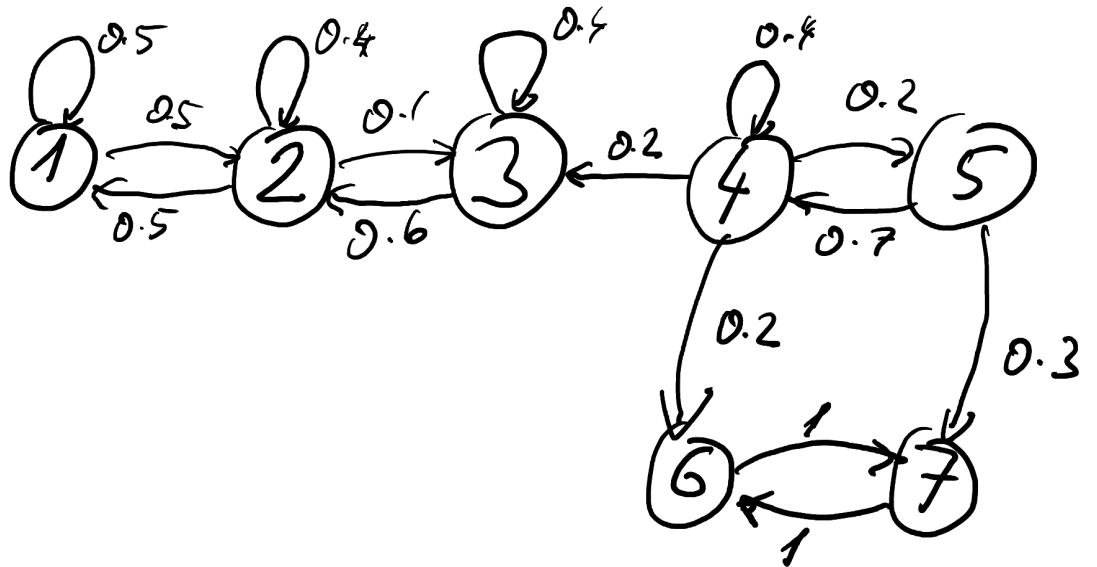


Exercise session 3 – Prob. & Stat. 2 — Oct 17, 2023



1. Identify the transient and recurrent states. Determine the equivalence classes of \leftrightarrow and explain which of them are transient/recurrent, and which of the recurrent ones are periodic.
2. Does the distribution converge to a stationary distribution, if we start in state 1? If so, what is the stationary distribution?
3. Does the distribution converge to a stationary distribution, if we start in state 7? If so, what is the stationary distribution?
4. Assume the process starts in state 1, but we observe it after it (approximately) reaches stationary distribution.
 - (a) Find the probability that the state increases by 1 in the next step.
 - (b) Find the conditional probability that the process is in state 2 given that the first step is an increase by 1.
 - (c) Find the probability that the state increases by 1 in the next change of state. (I.e. changes by 0 do not count.)
5. Assume the process starts in state 4.
 - (a) For each recurrent class find the probability, that we reach that class at some time.
 - (b) What is the expected time till we reach some recurrent state?