

Exercise 1 (Sigma Algebras)

3 points

Consider a finite DTMC $D = (S, \mathbf{P}, s_{init}, AP, L)$ and subsets of states $A, B \subseteq S$. Show that the following two sets of paths are measurable, i.e. contained in the σ -algebra of D :

- a) the set of paths starting in state s_{init} and remaining forever in states from A ,
- b) the set of paths starting in state s_{init} , remaining forever in states from A and passing through a state in B after exactly 5 time-steps.

(Note on the course: Adapted from Prof. Joost-Pieter Katoen's course titled "Modelling and Verification of Probabilistic Systems", available at <http://moves.rwth-aachen.de/teachings/ws-1516/movep15/>.)