

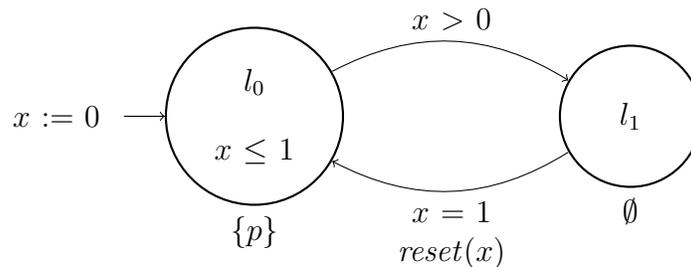


Modeling and Analysis of Hybrid Systems - SS 2015

Series 4

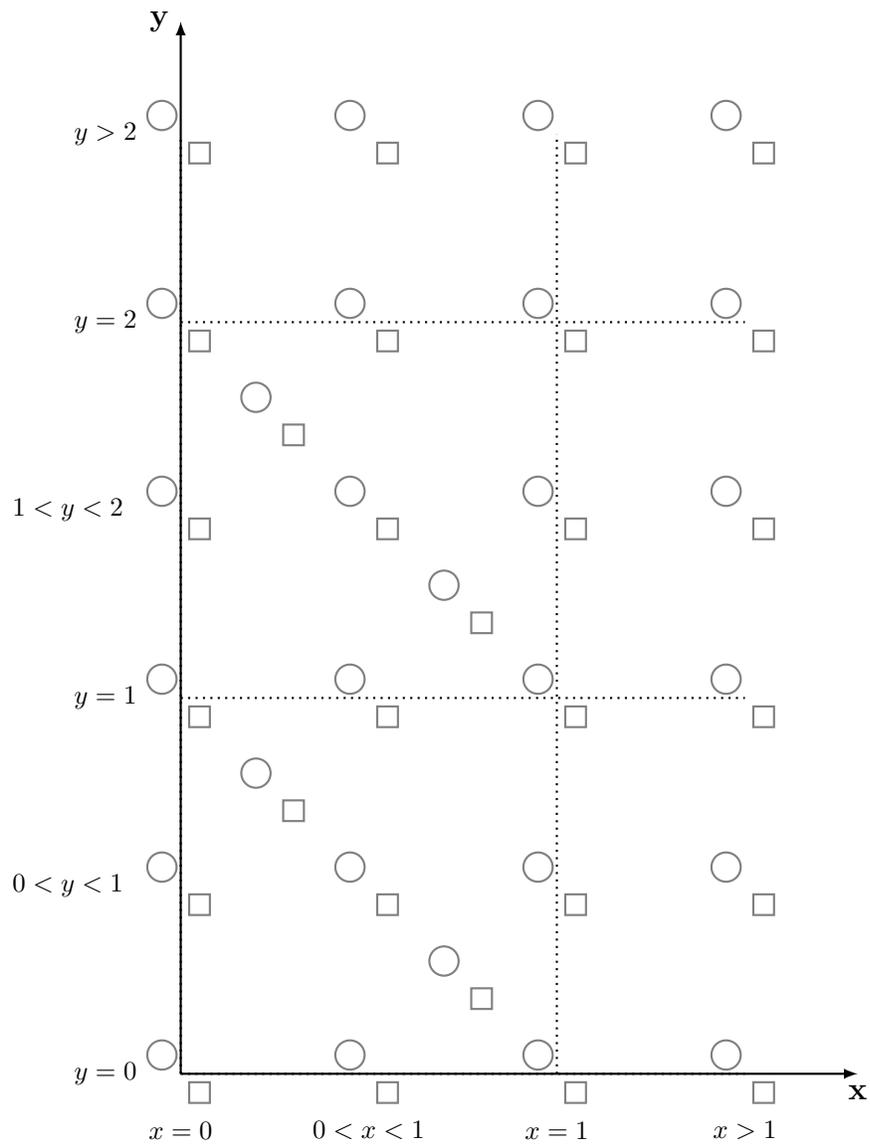
Exercise 1

Consider the following timed automaton \mathcal{T} :



Please perform the TCTL model checking algorithm as presented in the lecture on \mathcal{T} and verify $\mathcal{T} \models \varphi$, where $\varphi = AF^{\leq 2}p$.

- a) Construct $\hat{\varphi}$ by eliminating timing parameters from φ . Use the name y for the auxiliary clock.
- b) Construct a *RTS* \mathcal{R} , such that $\mathcal{T} \models_{TCTL} \varphi$ iff $\mathcal{R} \models_{CTL} \hat{\varphi}$. As \mathcal{R} will become big, use the prepared grid below to sketch the *RTS* (by adding the required transitions) as follows:
 - \bigcirc represents a state, where the location is l_0 .
 - \square represents a state, where the location is l_1 .
 - The position of a state in the grid remarks, which clock region the state represents.
 - Please draw only the reachable fragment of \mathcal{R} .



- c) Apply CTL model checking to verify $\mathcal{R} \models_{CTL} \hat{\varphi}$. You can color states in your previously created *RTS* to indicate that a certain subformula holds in the respective state.