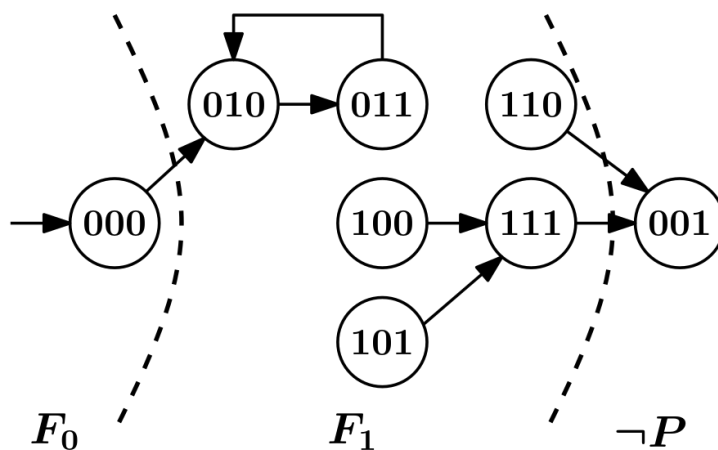


Model Checking Homework 4

Deadline: 7 April 4:00pm

Send solution to: modelchecking@iaik.tugraz.at

Consider the following synchronous Kripke structure K , with states of the form $x_1x_2x_3$. The only initial state is 000, and we are given a property P that holds everywhere but in 001.



We wish to prove that P is always true using PDR. We began the algorithm, obtaining the frames F_0 and F_1 as shown in the figure.

Task 4a [4 points]. Starting from the figure, carry out two iterations of the first variant of the PDR (from $k=1$, until $k=3$) shown in class. Clearly indicate the steps and the frames at the end of each iteration. Is the property P verified at the end? Why/Why not?

Task 4b [3 points]. As before, perform two iterations of PDR starting from the figure. This time use “naive generalization” during the removal of bad states, as shown in class. Clearly indicate the steps and the frames at the end of each iteration. Is the property P verified at the end? Why/Why not?

Task 4c [3 points]. Which of the following statements are false? Justify your answer.

- The set $\neg x_1$ is inductive.
- The set $\neg x_3$ is inductive.
- The set $\neg x_2$ is inductive relative to $\neg x_1$.
- The set $\neg x_3$ is inductive relative to $\neg x_1$.