UPPAAL Model Structure Design

In continuation of the previous chapter, we can now state that a set of functions describe the behavior of a set of traces. But what do we mean with behavior? Well, we referred to it as a functionality of a state from a timed automaton. Like discussed in the background section, a timed automaton can be represented as a model by using the UPPAAL modelling tool. This chapter will explain how a set of functions are converted to a set of locations in UPPAAL with their respective guards and invariants, in order to represent the functionality of a model. (remember to clarify before or after that the trace’s behaviors are expressed as a probabilistic model).

Equations

Given the fact that a function from an analysis can either be a polynomial, exponential or cosine function. All of them are going to be equally treated as an equation with the following structure:

Name is used as a unique identifier, data contains the actual mathematical function, followed by its lower and upper bounds. Where the lower bound represents the first time unit when the function will be active in the model. As in contrast of the upper bound, which represents the last time unit that the function will be active in the model.

Let us now proceed and explain the creation of an UPPAAL model based on the following trace of equations:

Location

Edges

Branch Points

Explain in this chapter how each equation is treated as an independent set of locations and on the next chapter explain how the 7 cases work.