In RCP$^\text{u}$, the fixed structure of the controller is incorporated into the constraints of the problem. The coefficient of this controller, namely vector of p, ~~are~~ is considered ~~as~~ decision variables of the optimization problem and can be obtained by solving this program. Similar to the verification problem, discussed in Section4, RCP is hard to be solved because both input and state live in an infinite set. One also needs the dynamics of the system to enforce the last condition, so~~. So,~~ we resort to the scenario approach by taking samples from both sets of state and input and construct a sampled optimization problem. For ~~that~~ the sake of ~~briefness~~brevity, this program is not mentioned here but we call it SCP, as it is needed to present our results toward the~~in the remaining~~ of this section.

Since the map f is unknown, one can come up with the empirical mean to approximate the expected value ~~which~~ ~~appears~~appearing in the last constraint of SCP. Then a new scenario program can be set up as following: