During the previous work at MCubelab, there was no systematic and objective way to evaluate the global trajectory resulting from the FOM control law, the exit or failure of an experiment was mainly determined in a subjective binary way. If the pusher slider didnt show appreciable divergence (at the naked eye) from the planned trajectory it was considered a success, otherwise it was a failure. In a similar fashion if the system was perturbed (by an external interaction), the success lied in recovering the original trajectory in a reasonable time determined subjectively. The main goal of the study was just to demonstrate that FOM could effectively control the pusher slider system to track previously planned trajectories, and that all this process could be done online. Because of this proof-of-concept nature, this approach was sufficient.

In this thesis we want to optimize the performance of the FOM and this requires a certain notion of metric or score for the result obtained. We decided to ignore the cost of the controller and we adopted a quadratic cost on the state variables. To keep consistent with the local problem we used the same cost matrix Q as in the MPC obtaining $S = sum(x_t Q x)$.