PRESENTATION SCHEME

Duration: 40 minutes of presentation, 20 minutes of discussion

Parts (in verde le slide già abbozzate)

* Intro 1 slide: What is the problem? What is the goal?
* Problem approach 2 slide: how we approached the problem and how we will discuss solutions. General constraints (dimensions of the world, initial conditions, blabla)
* Consensus problem 1 slide
* Regulation problem 1 or 2 slides: show validity of both posture and cartesian regulation. Which is more valid for our purposes? Which proved to be the best in practice
* Interaction between tracking control and regulation 1 slide: explain how we choose the proximity threshold and the trajectory to follow. How do we switch between controllers? How was it implemented?
* Present testing method for controllers 1 slide
* Tracking control problem: 2 for each controller (total of 8)
  + For each: present the scheme, the results, the complications during implementation, the pros and cons. DEFINE BELOW HOW TO TEST PROPERLY
* Compare the controllers 1 slide: show a table to present a recap
* Choose the best one 1 slide: present our judgement process and show live animations of the best approaches
* Discuss limit and fault cases 2 slides
* Additional graph, videos and tests are a plus
* Add slides to present problems OF ANY KIND encountered during the resolution of the task

POSSIBLE TEST STRATEGY

Introduction of ERROR TEST block

The error test block computes for each agent the norm of the distance between the desired trajectory and the agent (eg the error). As soon as the tracking trajectory controller takes over the error is used to detect if we are close enough to the desired trajectory. In that case the error test is passed. In particular the test is passed if the error norm is less than 1 for more than 1.5 seconds

Testing strategy (explained for one agent)

We will define 3 different tests (green = already implemented):

1. Convergence test: we compute N simulations starting from random initial conditions. Then we compute the convergence percentage over 150 simulations
2. Smoothness test: starting from fixed positions, we check if the agent behaves smoothly especially when switching controller and approaching the final trajectory. Orientation Graphs will be very useful
3. Sensitivity test: what if we slightly modify the gains? Which is the most robust controller? We will define a range (for example 1% change percentage) and we will repeat convergence test
4. Proximity test: which controller is the most accurate (aka close to the reference)? Use error check scope to obtain the data? How fast they converge?