

MAS416 – Robot Project, Supervisor Guidance

The main targets of the robot path tracking project are as follows:

- one or more simulation models of the robot in Matlab/Simulink/Simscape with forced motion (kinematically determined) that can follow a predefined path without rotating the end body,
- a simulation model of the robot in Matlab/Simulink/Simscape with geared servomotors on all six axes and with control strategies implemented to replicate the forced motion within some tolerances,
- path generating software that can set up a predefined path for the robot end point,
- • some kind of optimization effort that tries to reduce the costs of the geared servomotors and/or the time to travel the predefined path.

It is recommended that a Matlab-code or similar is developed that can generate a predefined path.

The quality of the project is based on whether the students manage to set up model(s) that reflect the dynamics of the robot and manages to control the robot motion so that it follows the predefined path. This includes implementing a control structure with computation of reference behavior and feedback and/or feedforward loops and using the data supplied in the project description correctly.

The main project should reflect a good understanding of the physical principles behind the robot, the overall control strategies, the state variables of the model(s), the influence of the prescribed path on the robot behavior and the tradeoff between costs and time-of-operation. The main project should also reflect the ability of the students to use modeling and simulation as a tool in design (in this case choice of geared servomotors and design of a predefined path and design of robot axis control) and understand the limitations and possibilities of a commercial software like Matlab/Simulink/Simscape.

The main project should also reflect the ability of the students to use modeling and simulation as a tool in design (in this case design of a controller) and understand the limitations and possibilities of a commercial software like Matlab/Simulink/Simscape.

There are no guidelines for the content of the report, only that it should be less than or equal to 15 pages (appendices allowed). The main purpose of the report is to demonstrate the work done by the students and the results of the project in a clear way.

Otherwise, it is recommended to read the project description carefully since it gives a clear indication of the amount of available modeling data and therefore, implicitly, the expected model complexity.