

A double arm robot is analyzed using the Modelica and Optimica software tools. Modelica is a tool for modeling complex physical systems whereas Optimica is provided by Jmodelica.org and is a recent easy-to-use extensible Modelica-based source for dynamic optimization. The double arm robot was not previously optimized with Optimica. The robot system consists of two rigid arms and two motors to actuate the two arms. The optimization algorithm objective is to move the tip of the robot from one position to another in a certain time with the least energy consumption. In order to program the optimization algorithm in Optimica it is necessary to write the differential equations of motion for the system which are derived using the Lagrangian's formula. The optimization algorithm for the double arm robot is programmed in Optimica and the results are plotted and compared. Furthermore, a closed loop PID controller is implemented for each actuator in Modelica with the objective of moving the tip of the robot from one position to another. The simulation results of the controlled robot are shown and compared with those of Optimica.