
(Spring 2007-08)

Lab Assignment #1-1Due **Tuesday, April 22nd**

The purpose of this assignment is to verify the matrix equations of $M(\Theta)$, $B(\Theta)$, $C(\Theta)$ and $G(\Theta)$ in Lab Assignment #1 by using Puma Simulator.

1. Download *control.cpp* file from class website (<http://cs225a.stanford.edu>) and replace your original *control.cpp* by the new one. Make sure to make a backup of the original *control.cpp* file. The new *control.cpp* file will be used only for this assignment.
2. Implement the function of *ComputeMatrices()* at the end of *control.cpp*. Fill in the equations of sM , sB , sC and sG with your equations calculated in Lab Assignment #1. Then compile the project.
3. When new *control.dll* is created, run the puma simulator.
4. Select **3-DOF** in the robot selection drop box.
5. At the initial state of joint angles (0.0, 0.0, 0.0), select *proj1* control in the control type selection drop box. Then click start button by the drop box.
6. Make sure new *matrix_output.m* file is created in the directory of puma simulator, and then make a copy of the output file with a different name like *matrix_output_001.m*.
7. Select *jmove* control and set joint angle as (30.0, 0.0, 0.0). Then click start button.
8. Select *proj1* control and click start button. Make sure new *matrix_output.m* is create in the directory of puma simulator then make a copy of the output file as before.
9. Repeat step 7 and step 8 with joint angles of (0.0, 90.0, 0.0) and (0.0, 0.0, 60.0)
10. The output file is in the format of matlab syntax, so you can use matlab program to verify your results or produce a report.
11. Verify your equations of Lab Assignment #1 by comparing *M_sim*, *BC_sim* and *G_sim* with *M_my*, *BC_my* and *G_my*. When comparing *G_sim* and *G_my* difference less than 10% is acceptable because simulator computes gravity force with a different method. But in cases of *M* and *BC*, almost identical numbers will be returned if the implementations are correct.
12. Submit a report which shows comparisons of your data.