Puma 560 Test 1
Robotics and Automation 282 762

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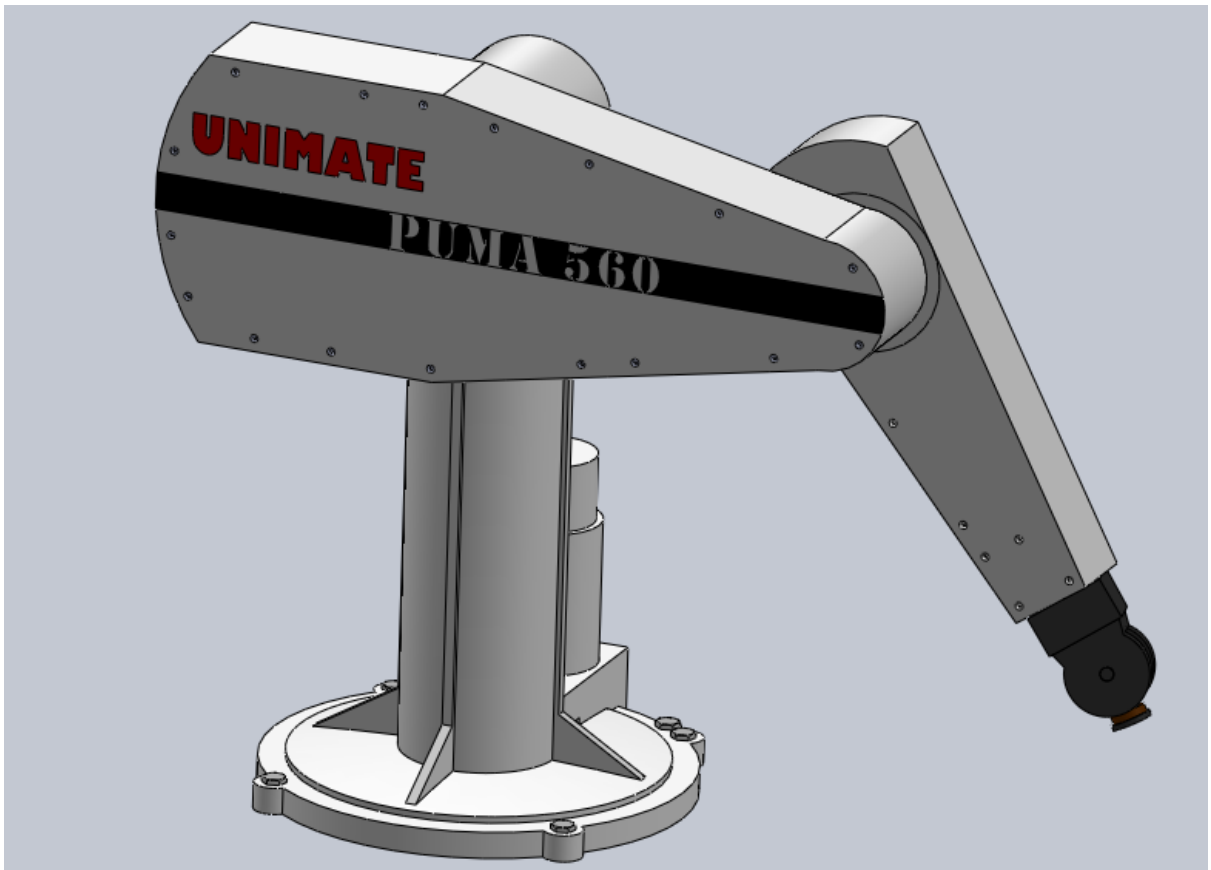

Abstract

A brief report of the Puma 560 trajectory demonstration and plots using Peter Corke's Toolbox

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1 Part A: Code Snippet

Please find Part A in the local directory saved as "Initials.m" note that this matlab file contains all detailed comments for reference from the lecture slides and Peter Corke's Toolbox functions.

The snippet contains the described below and a the full version has also been included in the appendix of this document.

2 Part B: Trajectory in 3 Dimensions

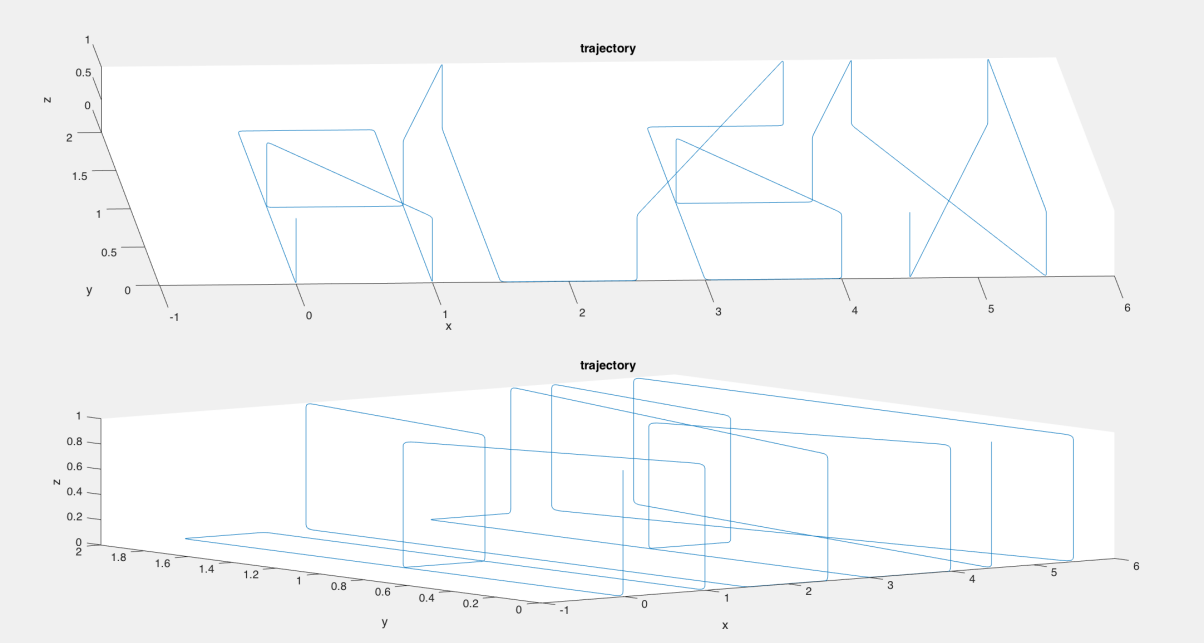

Figure 1: A plot of the end effector trajectory in 3 Dimensions (X,Y,Z)

3 Part C: Joint Angles with respect to Time

4 Part D: XYZRPY Magnitudes with respect to Time

5 Part E: choice of trajectory generation technique

The implementation of the mstraj (Multi-segment multi-axis trajectory) function has been used when creating the path of the trajectory as it has both the properties of the cartesian and joint space method trajectories. Better results are produced when creating curved and straight lines on the x, y and z axis and when approximating fonts there is a more steady range available, for instance the flat head 'A' could be written as a sharpe head or a curved head while maintaining integrity of the path with direct translation instead of pose motion.

From the information shown on the plots above there are sudden changes in joint angles at = and = which may cause issues with other joints e.g. singularities.

6 Part F

The mstraj function Produced a good result, and the characters "ALEX" have turned out clear and precise. There is room for improvement as producing scaled and more elegant fonts are optional to an extent based on the constraints of the joint angles.

When demonstrating this method on a non-virtual machine, it is necessary to take the trajectory limitations from joint angles into account for things such as singularities and overlapping. If there are no other interferences and disturbances in the trajectory the live demo may be accomplished successfully.

7 Video Demo

Please find A video demonstration of the Puma 560 trajectory for "ALEX" in the local directory saved as "Demo.mp4"

References

http : *//petercorke.com/Robotics*$_T$*oolbox.html*
Stevens Lecture Notes Part B (Peter Corke - Chap 7 - Second Half)
Stevens Lecture Notes Part A (Peter Corke - Chap 7 - First Half)
Stevens Lecture Notes Part C (Peter Corke - Chap 8)
Stevens Lecture Notes Part D (Peter Corke - Chap 9 - First Half)

APPENDIX