REPORT

Homework3

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(Important)Link on program: https://github.com/StalkerSanya/Homework3-Dynamic

1. 1) $H_1^0 = R_{z0}(q_1^*)T_{z0}(d_1)R_{x0}(90^o)$
   2) $H_2^1 = R_{z1}(q_2^*)R_{y1}(90^o)R_{z1}(90^o)$
   3) $H_3^2 = T_{x2}(a_2)T_{x2}(d_3^*)$
   4) $H_3^0 = H_1^0 H_2^1 H_3^2$

2. 1) If p_x and $p_y \neq 0$ then $q_1^* = atan2(p_y, p_x)$, else q_1^* is udentified;

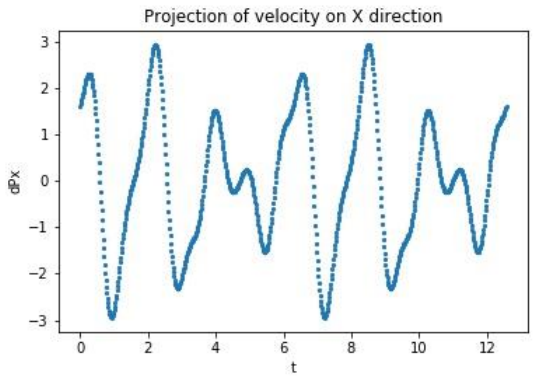
   2) $q_2^* = atan2(p_z - d_1, \sqrt{p_x^2 + p_y^2})$;

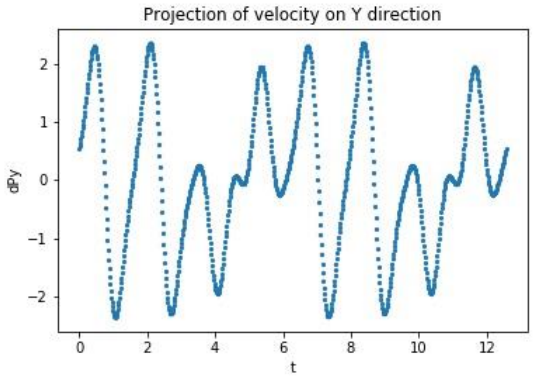
   3) $d_3^* = \sqrt{p_x^2 + p_y^2} - a_2$.

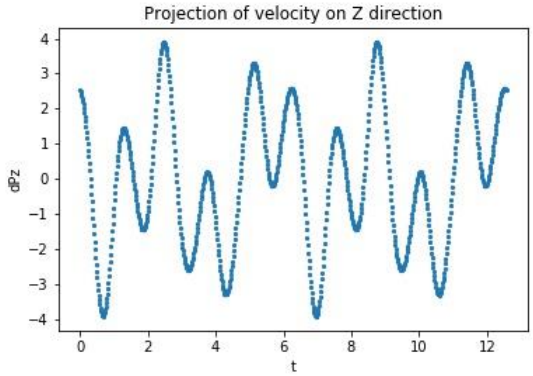
3. This task I did in python(file: Jacopy.py). So I obtained the same Jacobian by classic approach and Jacobian by geometric approach.

4. For case when $q_2^* = \frac{pi}{2} \pm (pi)n$ we have singularity, because if $q_2^* = \frac{pi}{2} \pm (pi)n$ rang Jacobian =1, and so it < max rang = 3. In this case we have infinity number solution.

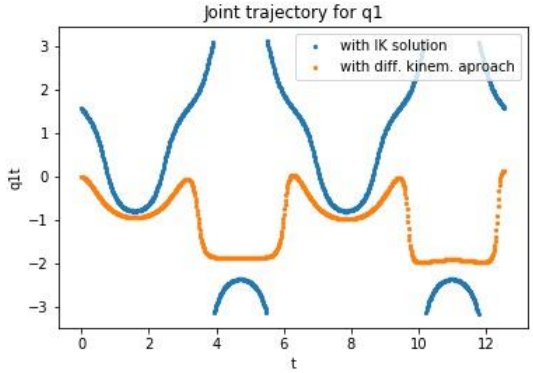
5.

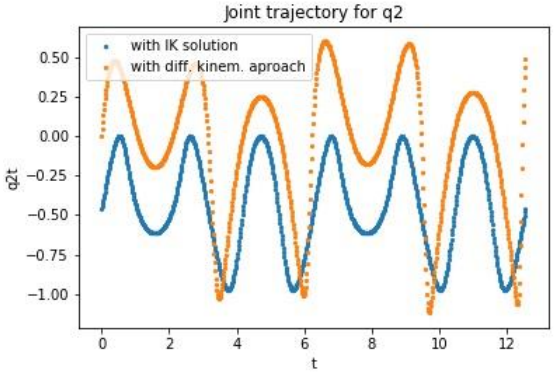


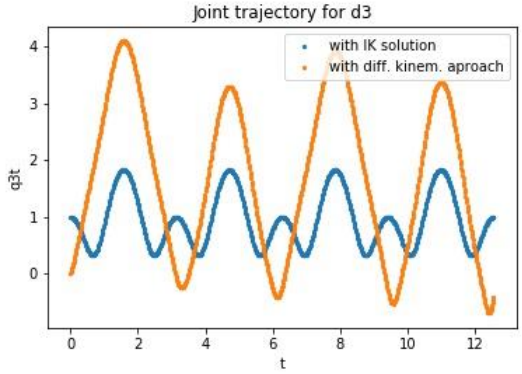



Projection of velocity on Z direction
dPz
t

6.


Joint trajectory for q1
with IK solution
with diff. kinem. aproach
q1t
t


Joint trajectory for q2
with IK solution
with diff. kinem. aproach
q2t
t


Joint trajectory for d3
with IK solution
with diff. kinem. aproach
q3t
t