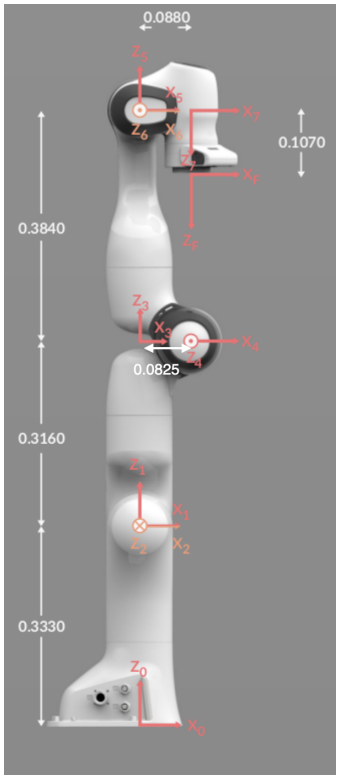
ROB2004 - Homework 4

Justify all your answers with complete sentences and provide typeset answers (e.g. using LaTeX[1])

Exercise 1 (100 points)



Consider the robot described above. It is a manipulator with 7 revolute joints. Frames 1 to 7 locate joints, their axes of rotation are represented by the z axis. The z-axis of Frame 2 points inside the screen and the z-axes of Frames 4 and 6 point outside the screen. Frame 0 is the base frame and Frame F is the end-effector frame.

- Write as a product of homogeneous transforms the forward kinematics of the robot, which computes the end-effector pose with respect to the base frame. Explain succinctly your method.
- Using the accompanying Jupyter notebook, write a function implementing the forward kinematics and verify that it works by comparing its output with the FK function from Pinocchio.
- Plot in a 2D graph the x and y coordinates of the points reached by the end-effector as it goes through the sequence of joint configurations described in the file *robot_trajectory.npy*.

[1] 1https://en.wikibooks.org/wiki/LaTeX, NYU provides access to Overleaf to all the community https://www.overleaf.com/edu/nyu