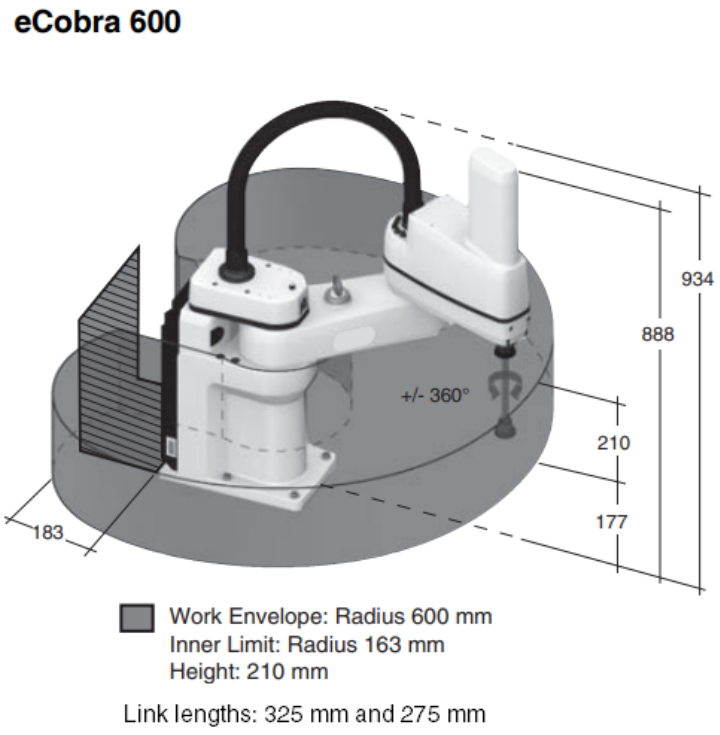
Digital twins for automation and collaborative robots
A.Y. 2023/24
Assignment #07

Prepare the solution to the assignment as a single script named as `labXX_NameSurname_ddmmyy.m`. Use the format suggested in Assignment #01. Keep in the same folder the function files that you will develop in this assignment. If necessary, you can reuse some functions from previous assignments.

1. Define a the correct set of DH parameters for the following robot and test them with the function `draw_DH`:



Consider also the possibility of adding more sets of DH parameters to improve the graphical representation. Calculate the position and orientation of the end-effector $\mathbf{P}$ as well.

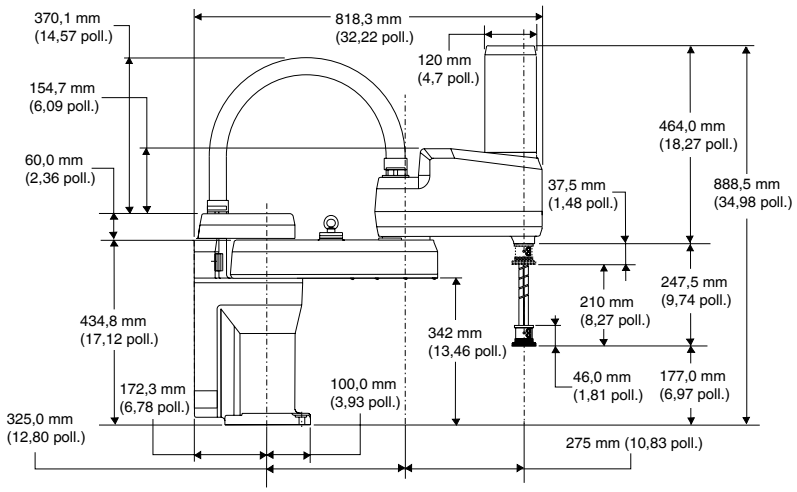
Check if choice of DH parameters is consistent with the kinematics evaluated using Matlab's Robotics Toolbox, by means of this code:

```
% load thre Ecobra600 robot as a rigidBodyTree
eco = loadrobot("omronEcobra600");
eco.DataFormat = 'col';
```

```
Q = [0,0,0,0]';  % vector of joint variables

figure(1)
show(eco,Q,'Frames','on','PreservePlot',false,'Collisions','off','Visuals','on');
axis([-1 1 -1 1 0 1]*.8)
view(44,16);
% direct kinematics
T04 = getTransform(eco,Q,'link4')
```

Be aware that the kinematics of the eCobra 600 robot is identical to the one of the Cobra 600 robot:



Adept 600 Cobra dimensions - link lengths: 325mm and 275mm

2. Write the function `dk_scara(q)` that takes as input the four joints variable as a single vector **q**, and outputs the position and the orientation of the end-effector.