DNRS- Home task (Kinematics)

Task:

1) Select a robot's elbow model from one of the following: Assign yourself a model from here
    a. Scara manipulator (refer to Spong)
    b. Stanford Manipulator
    c. Spherical Manipulator
    d. Antropomorphic
    e. Puma
2) Couple your elbow model with a spherical wrist that satisfies Euler angles arrangement (xyz, xzy, xyx, xzx, yxz, yzx, yxy, yzy, zxy, zyx, zyz, zxz)
3) Solve Forward kinematics problem (using DH-Parameter is **optional**). You can use 6 transformations between two frames.
4) Solve inverse kinematics problem using any approach you like.

Important Notes:

You need to write everything in code from scratch. Using libraries (like Peter corke) is not allowed.

References:

It is recommended to refer to these references for information about Euler Angles and the listed manipulator models.

1) B. Siciliano, L. Sciavicco, L. Villani, G. Oriolo, "Robotics: Modelling, Planning and Control", 3rd Edition, Springer, 2009
2) Mark W. Spong, Seth Hutchinson, and M. Vidyasagar, Robot Dynamics and Control, Second Edition, John Wiley & Sons, Inc. 2008

Submission:

You should submit a working code (python or Matlab) and a report.

In your report:

- A simple graph of your model
- Assignment of Coordinate frames on robot's joints
- Forward kinematics solution (only symbolic, the code is responsible for calculations)
- Inverse kinematics solution
- Results of code implementation
- Validation of inverse kinematics solution (inverse kinematics solution should correspond to forward kinematics solution)

Bonus task (up to 2 points out of 10):

- Plot full manipulator
- Animate your graph