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Applied Robotics

HW2: Forward and Inverse Kinematics of PUMA 260

PUMA 260 Links:

```
PL1 = Link('d', 13, 'a', 0, 'alpha', -pi/2);
PL2 = Link('d', 0, 'a', 8, 'alpha', 0);
PL3 = Link('d', -3, 'a', 0, 'alpha', pi/2);
PL4 = Link('d', 8, 'a', 0, 'alpha', -pi/2);
PL5 = Link('d', 0, 'a', 0, 'alpha', pi/2);
PL6 = Link('d', 2, 'a', 0, 'alpha', 0);
```

Creation of 2 PUMA 260 arms:

```
puma260 = SerialLink([PL1 PL2 PL3 PL4 PL5 PL6], 'name', 'Puma260');
puma2602 = SerialLink([PL1 PL2 PL3 PL4 PL5 PL6], 'name', 'Puma260-2')
```

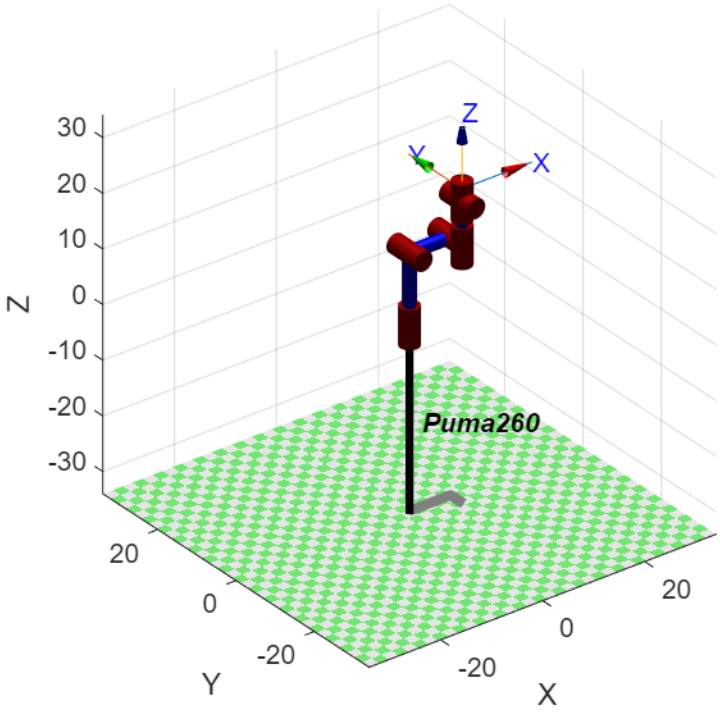
```
puma2602 =

Puma260-2:: 6 axis, RRRRRR, stdDH, slowRNE
+---+-----------+-----------+-----------+-----------+-----------+
| j |     theta |         d |         a |     alpha |    offset |
+---+-----------+-----------+-----------+-----------+-----------+
|  1|         q1|         13|          0|    -1.5708|          0|
|  2|         q2|          0|          8|          0|          0|
|  3|         q3|         -3|          0|     1.5708|          0|
|  4|         q4|          8|          0|    -1.5708|          0|
|  5|         q5|          0|          0|     1.5708|          0|
|  6|         q6|          2|          0|          0|          0|
+---+-----------+-----------+-----------+-----------+-----------+
```

0 degree position:

```
qz = [0,0,0,0,0,0];
inv1 = puma260.fkine(qz)
```

```
inv1 =
        1        0        0        8
        0        1        0       -3
        0        0        1       23
        0        0        0        1
```

```
puma260.plot(qz)
```

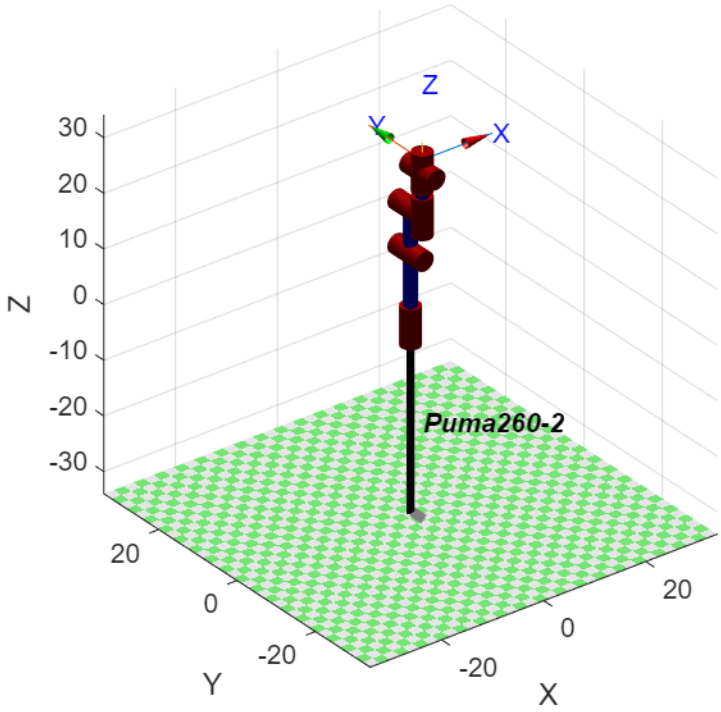


Upright Position

```
qz = [0,-pi/2,pi/2,0,0,0];
inv2 =puma2602.fkine(qz)
```

```
inv2 =
         1         0         0         0
         0         1         0        -3
         0         0         1        31
         0         0         0         1
```

```
puma2602.plot(qz)
```

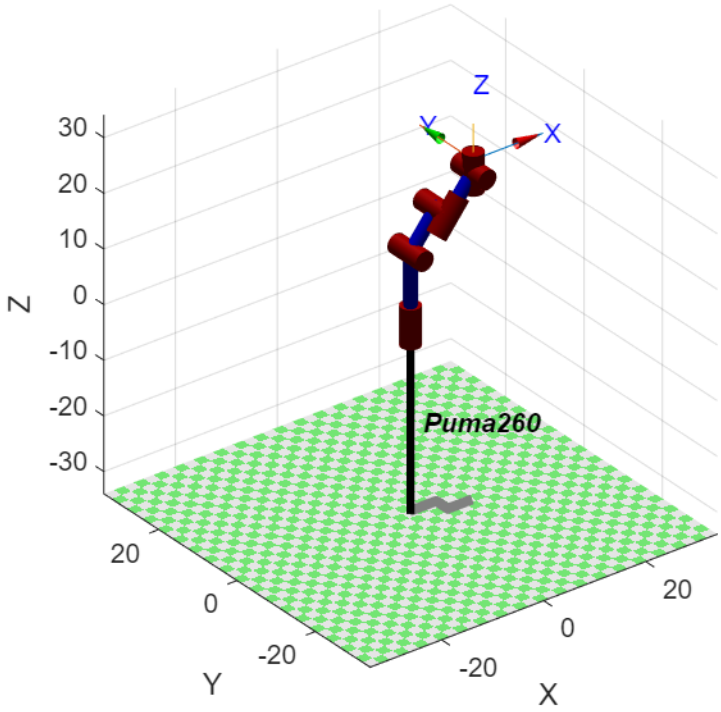


Obtaining the inverse kinematics of the previouse movements

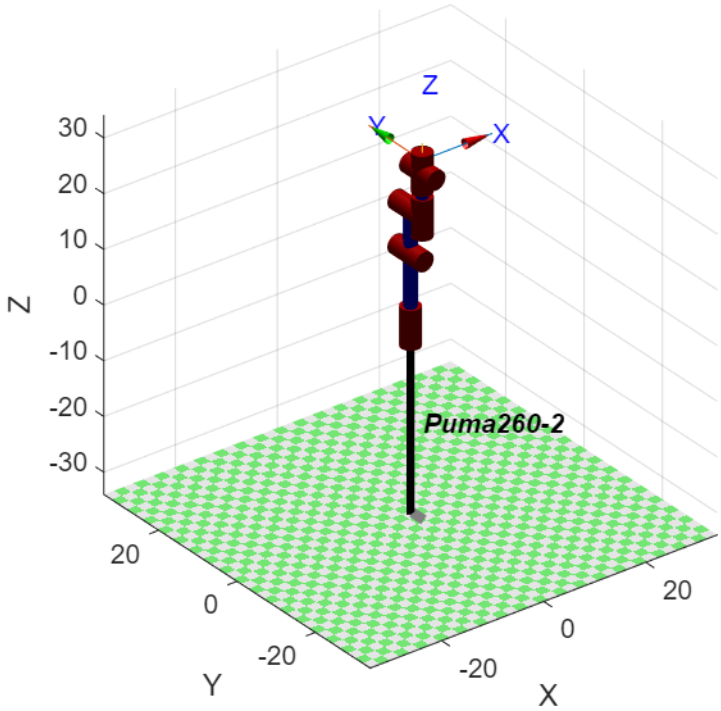
```
qi1 = puma260.ikine6s(inv1,'lu');
qi2 = puma2602.ikine6s(inv2,'lu');
```

Plotting the results of the obtained inverse kinematics:

```
puma260.plot(qi1);
```




```
puma2602.plot(qi2)
```



Conclusions:

The position of each joint may be different than the one established with forward kinematics, but the end effector position is the same in both.