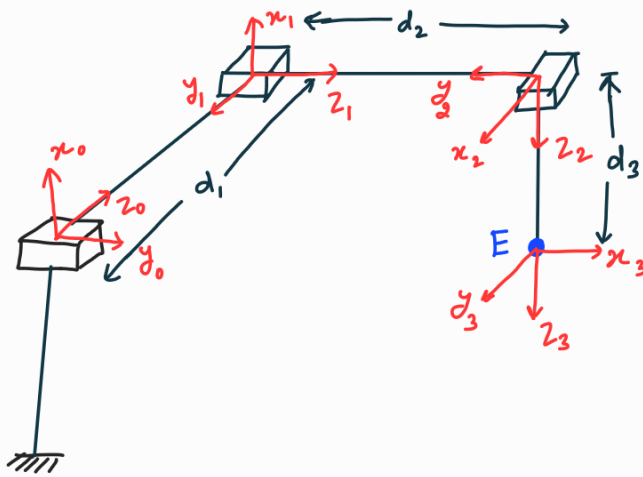


Solution ①, ②, ③, ⑥ Code file is attached with this PDF.

Solution ④, ⑤ Reading and review has been done from textbook.

Solution ⑦



DH parameters

| link | a_i | α_i | d_i | θ_i |
|------|-------|-------------|-------|-------------|
| 1 | 0 | -90° | d_1 | 0 |
| 2 | 0 | -90° | d_2 | 90° |
| 3 | 0 | 0 | d_3 | -90° |

- 3D printer (PPP) configuration
- DH convention followed
- It's clear from diagram itself that position of end-effector (E) in base frame $Ox_0y_0z_0$ is $[-d_3, d_2, d_1]^T$.
- We get same results from code.

Solution ⑧ • From problem ⑦, it is evident that inverse position kinematics of 3D printer is easy.

- Suppose coordinates of end effector (E) in base frame is $[p_x, p_y, p_z]^T$
- Then joint variables d_1, d_2 and d_3 will be as follows:

$$\boxed{[d_1, d_2, d_3]^T = [p_z, p_y, -p_x]^T}$$