**ME370: ADAMS LAB**

**Department of Mechanical Engineering,**

**IIT Bombay**



**Session 5 Report**

**Group / Section:** A8

**Name:** Ameya Halarnkar

**Roll Number:** 200020023



**Date:** March 5,2023

**Given Information**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Input Values | | Link Lengths | |  |
| Roll Number | X | Y | AB | BC | Translation Distance |
| 200020023 | 2.383 | 2.01 | 10 | 23.83 | 20.1 |

**Question 1 (Robotic Arm)**

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| **ISOMETRIC VIEW OF ROBOTIC ARM** |
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| **FRONT VIEW OF ROBOTIC ARM** |
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**Question 2 (No Translation)**

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| Function Builder Commands | |
| **JOINT MOTION TYPE** | Using Nested IF Loops |
| Velocity |
| **CODE FOR JOINT A** |
| IF(time-1.5: 30.0d,0,IF(time-3: 0,-30.0d, IF(time-4.5: -30.0d, 0,IF(time-6: 0,0,0)))) |
| **CODE FOR JOINT B** |
| IF(time-1.5: 0,30.0d,IF(time-3: 30.0d,0,IF(time-4.5: 0, 30.0d,IF(time-6: -30.0d,0,0)))) |
| **JOINT MOTION TYPE** | Using STEP Function |
| Displacement |
| **CODE FOR JOINT A** |
| STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 3.0, 0.0d, 4.5, -45.0d) |
| **CODE FOR JOINT B** |
| STEP(time, 1.5, 0.0d, 3.0, 45.0d) + STEP(time, 4.5, 0.0d, 6.0, -45.0d) |

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| **WORKSPACE BOUNDARY TRACE WITHOUT**  **TRANSLATION OF GROUND PIVOT** |
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**Question 3 (With Translation)**

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| Function Builder Commands | |
| **JOINT MOTION TYPE** | Using Nested IF Loops |
| Velocity |
| **CODE FOR JOINT A** |
| IF(time-1.5: 30.0d,0,IF(time-3: 0,0,IF(time-4.5: 0,-30.0d, IF(time-6: -30.0d, 0,IF(time-7.5: 0,0,0))))) |
| **CODE FOR JOINT B** |
| IF(time-1.5: 0,30.0d,IF(time-3: 30.0d,0,IF(time-4.5: 0,0,IF(time-6: 0,-30.0d,IF(time-7.5: -30.0d,0,0))))) |
| **TRANSLATION CODE FOR JOINT D** |
| IF(time-3: 0, 134,IF(time-4.5: 134, 0, 0)) |
| **JOINT MOTION TYPE** | Using STEP Function |
| Displacement |
| **CODE FOR JOINT A** |
| STEP(time, 0.0, 0.0d, 1.5, 45.0d)+STEP(time, 4.5, 0.0d, 6.0, -45.0d) |
| **CODE FOR JOINT B** |
| STEP(time, 1.5, 0.0d, 3.0, 45.0d) +STEP(time, 6.0, 0.0d, 7.5, -45.0d) |
| **TRANSLATION CODE FOR JOINT D** |
| STEP(time, 3.0, 0.0, 4.5, 201) + STEP(time, 7.5, 0.0, 9.0, -201) |

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| **WORKSPACE BOUNDARY TRACE WITH**  **TRANSLATION OF GROUND PIVOT** |
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**Question 4 (End Effector)**

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| Function Builder Commands | |
| **JOINT MOTION TYPE** | Using Nested IF Loops |
| Velocity |
| **CODE FOR JOINT A** |
| IF(time-1.5: 30.0d,-30.0d, IF(time-3: -30.0d,0,0)) |
| **CODE FOR JOINT B** |
| IF(time-1.5: 30.0d,-30.0d, IF(time-3: -30.0d,0,0)) |
| **TRANSLATION CODE FOR JOINT D** |
| IF(time-1.5: 134,-134, IF(time-3: -134,0,0)) |
| **JOINT MOTION TYPE** | Using STEP Function |
| Displacement |
| **CODE FOR JOINT A** |
| STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 1.5, 0.0d, 3.0, -45.0d) |
| **CODE FOR JOINT B** |
| STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 1.5, 0.0d, 3.0, -45.0d) |
| **TRANSLATION CODE FOR JOINT D** |
| STEP(time, 0.0, 0.0, 1.5, 201)+STEP(time, 1.5, 0.0, 3.0, -201) |

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| **POSITION OF END EFFECTOR FOR**  **SIMULTANEOUS MOTION OF ALL ACTUATORS** |
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—X—X—X—X— X—X—X — X—**END**— X—X— X—X— X—X— X—X—