Robot Programming Lab #8 Motion commands JD Jones / J Nelson

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Point Value = \_\_\_\_\_\_\_\_\_\_/100 points

In this lab you will be learning how the motion command breaks down. You will create a new program.

First let's break down the motion command.

1: J P[1] 100% fine

The J can be 3 options.

J = Joint

L = Linear

C = Circular

The Joint is the quickest way to move from one position to another. The path of travel is up to the robot. It is unpredictable.

The Linear means the robot will go in a straight line from point A to point B. The motors must work together to make the tool stay in a straight line.

The Circular means the robot will move in an arc. When you choose this movement it will automatically create another line with a P [ X ] in the next line. It will look similar to this.

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1: J P[1 start of arc] 100% fine

2: C P [2 arc point]

: P[3 end point of arc] 250mm/sec fine

3: J P[4] 100% fine

The arc is started wherever the robot is before the C command. The radius is the P [2] and the finish point is P [3] then it will move joint to P[4].

To change the J to anything else you put the cursor on the J and F4 Choice will come up. Press F4 Choice. Select the option you wish from the menu and press enter.

The next portion of the motion command is the 100%.

This is how fast the robot will move going to this position. This is much easier to see when you put the robot in STEP mode. This can also be done by mm/sec. When you change to linear it changes this setting also.

The next portion of the motion command is the Fine.

This is how the robot will END the motion going towards this position.

The choices are:

Fine = Fine

CNT = continuous

Fine means the robot will come to a complete stop at that position. This might not be very long but it will stop.

Continuous means the robot will go towards that position but not actually stop at it. I call it cutting the corner. When you put in the CNT element it automatically pops up another number. This is how much it will cut the corner. 0% is the same as fine command. 100% means it will cut the corner the most.

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| --- | --- |
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1: L P[1] 250mm/sec fine

2: J P[2] 100% CNT 100

3: L P[3] 250mm/sec fine

3: J P[4] 100% fine

In this lab teach a simple rectangular box. The box should be roughly 12” x 8”. Use blocks or pegs to signify the corners. Teach the robot all 4 corners of the box about 1 inch above the block/pegs.



Have all the move commands with JOINT moves.

Run the robot and watch how it moves from one position to the next. Do NOT have the robot in STEP mode.

**How did the robot move? Straight line, slight curve or in an arc with at least a 5 inch radius.**

Now change the move commands to LINEAR.

Run the robot and watch how it moves from one position to the next. Do NOT have the robot in STEP mode.

**How did the robot move? Straight line, slight curve or in an arc with at least a 5 inch radius.**

Now you will need to add a block/peg to the center of the box.

Change P[2] to a circular move. Use the center block at the arc radius. Make it position 5.

The program should look like this.

1: J P[1 start of arc] 100% fine

2: C P [5 arc point]

: P[2 end point of arc] 250mm/sec fine

3: J P[3] 100% fine

You may loose P[2]’s position information. You might have to touch up.

**How did the robot move? Straight line, slight curve or in an arc with at least a 5 inch radius.**

Now you need to adjust the speed of the moves

As you might have noticed when you run your program in automatic the robot moves back to the approach position prior to the gripper physically getting closed. You will need to add a WAIT command after the gripper open and close commands. Wait command is found under the INST button. You should be able to figure it out from here. Remember to insert a line otherwise you will write over the line you are on. You have one undo under the EDCMD button.

**TASK**

Rename lab 7 to be lab 8 and modify it for the move commands. You may have more than 5 positions.

**ITEMS that MUST be included in your program:**

· Joint movements

· Program the robot to draw a figure containing at least 5 Circular movements and 2 Linear movements.

· Adjust the speed

· Change some motions to continuous

· Add wait commands to the gripper open and close

· Make your program run like the robot was a human. Not a robot from the 80’s trying to do the robot dance with jerky motions.

Be ready to demonstrate the following to the instructor.

Points for

A) 5 Circular moves 20 pts

B) Linear move (this is ideal for the approach to pick up point). 10 pts

C) Adjust the speed of the motion commands not the override speed.10 pts

D) Change some motions to continuous 10 pts

E) Add wait commands to the gripper open and close 10 pts

F) Make your program run like the robot was a human. Not a robot from the 80’s trying to do the robot dance with jerky motions. 20 pts

G) Saving your program onto a jump drive. 10 pts

H) Printing your program. 10 pts

INSTRUCTOR’S INITIAL\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_