

Linear Stage Lab Report

-Jiawei Ge

Purpose: Realizing accurate and repeatable linear stage robot control.

Process: 1. Build the stage; 2. Test the motor; 3. Understand all the Matlab files and Complete the code in task.m file; 4. Realize the position control; 5. Read and analyze the position record.

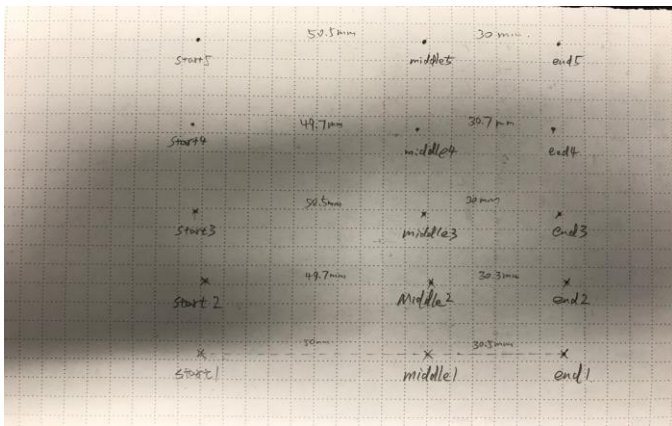
Trouble Shooting:

1. The depth of two threaded holes in two of my SC8UU Linear Bearings is different from ones other students get. It should be compatible with M4 × 10 socket-head screws as described in the tutorial but with M4 × 8 socket-head screws for the SC8UU linear bearings I get, thus making the change of 2 M4 × 10 socket-head screws which are paired with the leadscrew nut housing to 2 M4 × 8 socket-head screws in order to adjust the height of leadscrew.

2. The program terminates itself when the motor running counterclockwise at a random position while the indicator light on the power supply blinks. After debugging from codes to all the possible factors, I'm positive that the loose of cables, which are mounted inside the 12V 0.4A NEMA-17 stepper motor, leads to the problem. I changed a new one from our TA and the stage works well then.

Results:

All the data are presented in the following table. The unit of the numbers is millimeter(mm) and the formula of standard deviation used is $\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{(n-1)}}$. The graph paper picture and assembled stage picture are posted below.



	Start to Middle	Middle to End	End to Start
1	50.00	30.50	80.50
2	49.70	30.30	80.00
3	50.50	30.00	80.50
4	49.70	30.70	80.40
5	50.50	30.00	80.50
Average	50.08	30.30	80.38
Median	50.00	30.30	80.50
σ	0.40	0.31	0.22

