

Report for Auto Control Lab1 and 2

Jacky Yeh 4107064003

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1 Introduction

This is the first Experiment of Auto Control Lab where TAs taught us some basic concepts and usages in MATLAB for us to better understand the plotting and some basic functions for future learnings.

2 LAB1

2.1 Basic usages of plotting functions and matrices

Objective: To perform basic operations on matrix and plotting graph.

These are the stated Homework problems

Lab1 Homework

1.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}, B = \begin{bmatrix} 9 & 8 & 7 \\ 6 & 5 & 4 \\ 3 & 2 & 1 \end{bmatrix}$$

solve: (a) $A+B$, (b) $A \times B$, (c) A^2 , and (d) B'

2.

(a) plot: $\cos(x)$ (plot symbols and colors is star and yellow)

(b) plot: $\sin(x)$

(c) plot: $\cos(x)$ and $\sin(x)$

(d) plot: e^{-x} (plot symbols and colors is plus and black)

note:

(1) subplot, (2) $-\pi \leq x \leq \pi, 0.1$, (3) title, (4) x and y label,

(5) grid, and (6) legend

2.2 MATLAB CODE FOR LAB1

In order to perform the tasks, Matlab codes are needed. The following is the code

```
%1.1

A = [1 2 3; 4 5 6; 7 8 9]
B = [9 8 7; 6 5 4; 3 2 1]

A+B %a)
A-B %b)
A/2 %c)
B\ %d)

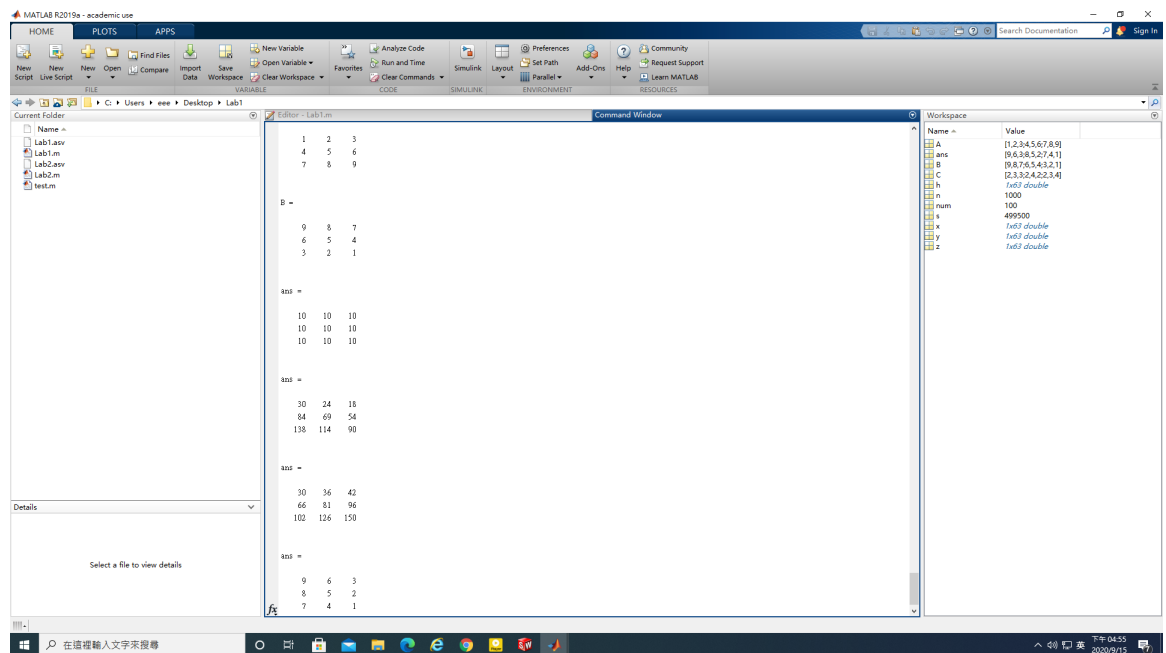
%2

x = -pi : 0.1 : pi ;

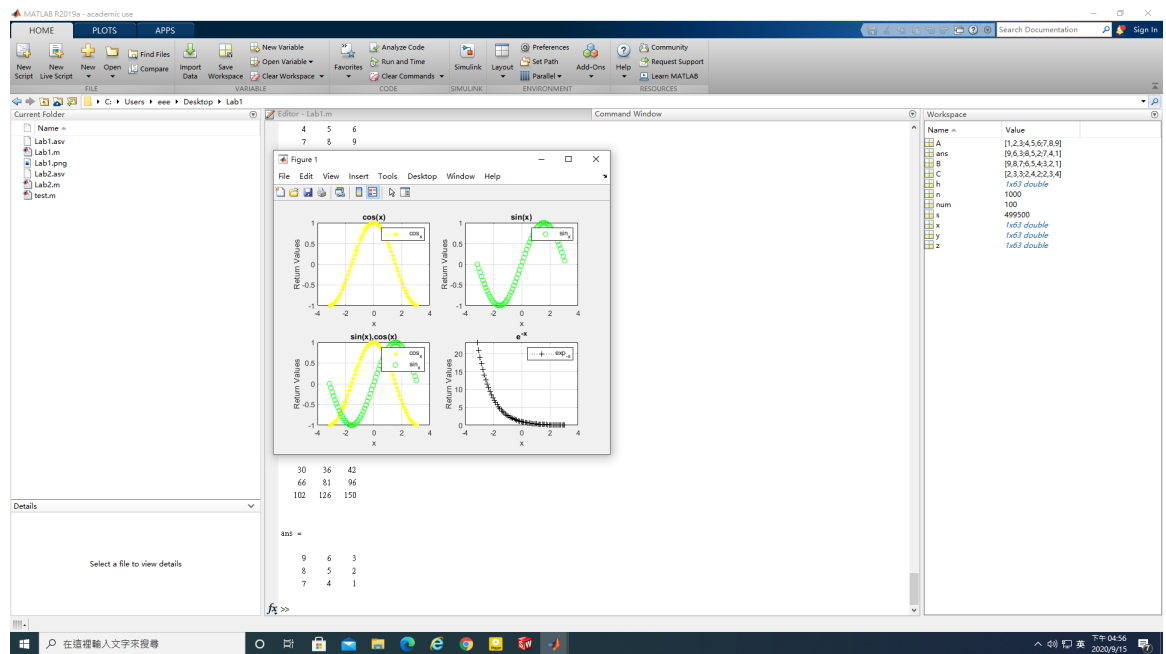
y = cos(x);
z = sin(x);
h = exp(-x);

subplot(2,2,1), plot(x,y, 'y*'), legend('cos_x'), xlabel('x'), ylabel('Return Values'), title('cos(x)'), grid on;
subplot(2,2,2), plot(x,z, 'og'), legend('sin_x'), xlabel('x'), ylabel('Return Values'), title('sin(x)'), grid on;
subplot(2,2,3), plot(x, y, 'y*'), x, z, 'og'), legend('cos_x', 'sin_x'), xlabel('x'), ylabel('Return Values'), title('sin(x), cos(x)'), grid on;
subplot(2,2,4), plot(x,h, 'k+'), legend('exp_{-x}'), xlabel('x'), ylabel('Return Values'), title('e^{-x}'), grid on;
```

The results in this are for the arithmetic operations on matrix A and B



The results in this are the subplots for $\cos(x)$, $\sin(x)$ and e^{-x} with a range from $-\pi \sim \pi$ with titles, grids and legends on



3 LAB2

3.1 Basic usages of for,while and switch and matrix arithmetic

Objective:To perform basic functions on matrices and basic usages of iterative functions such as while, for and statement functions such as switch, if

Lab2 Homework

1. A: 3x3 random integer matrix (integer range:1~6)
B: 3x3 Identity matrix
Solve:(a) A (b) B (c) A+B (d) main diagonal of (c)
2. Use Switch to display if score is 90-100 , is A
score is 80-90 , is B
score is 70-80 , is C
score is 70 ↓ ,is fall

Hint 使用 floor(a/b)取商值

3. Use while loop to calculate the summation of the series
 $1+2+3+\dots+999$

3.2 Matlab Code for Lab2

The codes which perform the tasks are stated below

```
%1
A = randi(3,3,3) |
B = eye(3)

C=A+B

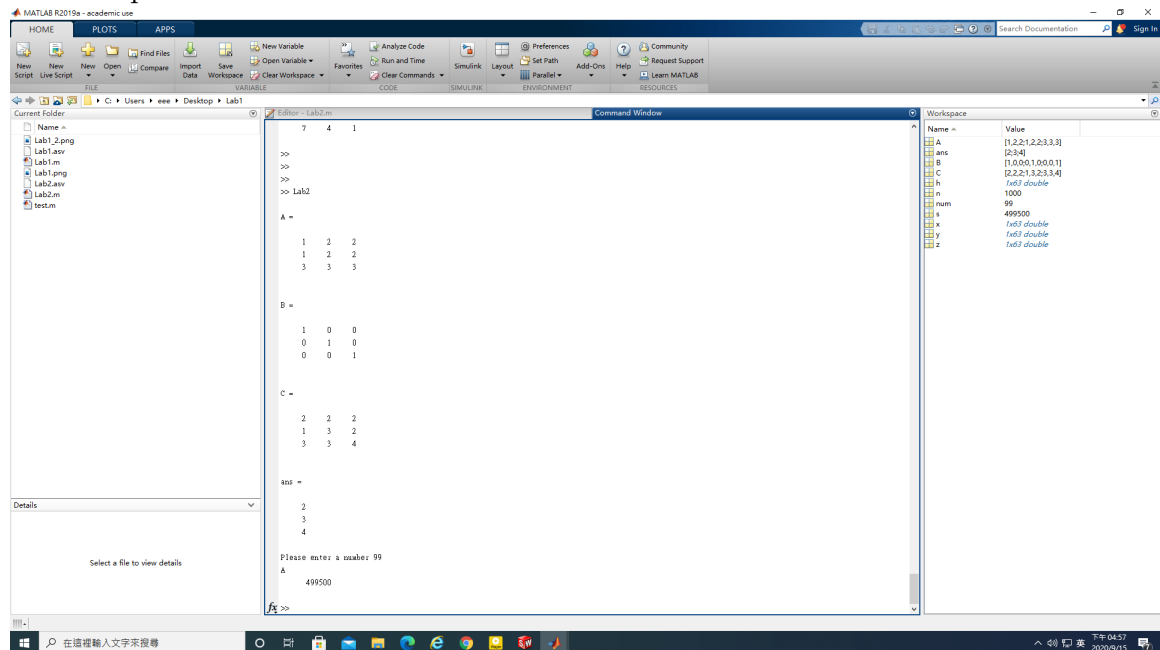
diag(C,0)
%2
num = input('Please enter a number');
switch floor(num/10)

    case 9
        disp('A');
    case 10
        disp('A');
    case 8
        disp('B');
    case 7
        disp('C');
    otherwise
        disp('You fail');

end
%3
n = 1;
s = 0;

while n < 1000
    s = s + n;
    n = n + 1;
end
disp(s);
```

The computed results are shown below



4 Conclusion

This is the first lab class in Matlab which is still easy for now, however, in order to perform well in Matlab coding, practices are needed. As a result, these basic operations should eventually become an instinct as a Matlab Programmer. Otherwise, future courses involving these kinds of basic operators might be difficult for those who did not practice well. And also this give me a chance to practice making report with Latex which is a pretty good tool for thesis writing.

This concludes the first Week Auto Control LAB