

# 介面

## 實驗一

人機介面(Digital Data Acquisition System

HMI 數位資料擷取系統 人機介面)

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日期：109/8/18

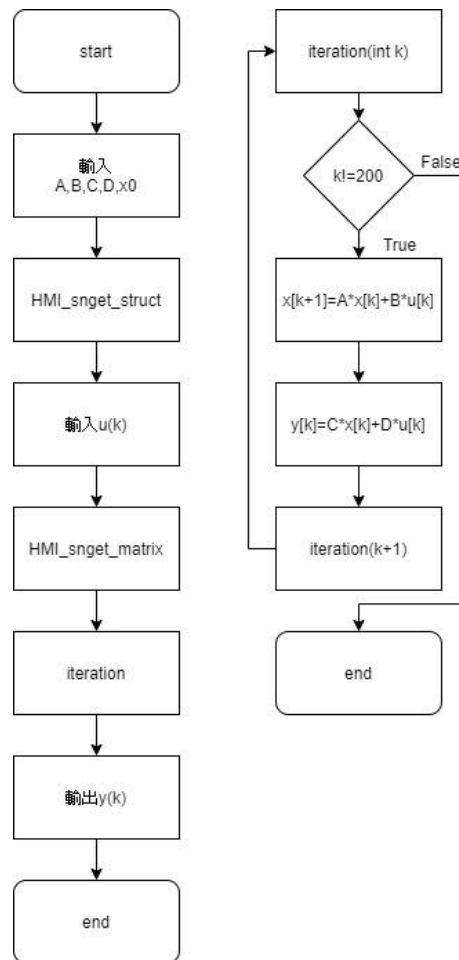
# 介面工作日誌

實驗一

109 年 8 月 18 日

組別		姓名	黃鈺淳	學號	108303013
實驗起始時間	109/7/25			費時	24 天
實驗結束時間	109/8/18				
所遭遇問題					
解決方法					
完及成心項得目・					
調查	<input type="checkbox"/> 是否有看課程講解影片 是否實用？有何建議？		<input type="checkbox"/> 是否有看實驗教學影片 是否實用？有何建議？		

## 一、流程圖



## 二、程式碼

### 實驗前置步驟(產生弦波)—matlab

```
clear all;
close;
t = linspace(-0.5, 0.5, 200);

sin = single(sin(30 * t));
save('sin', 'sin');

cos = single(cos(60 * t + 2));
save('cos', 'cos');
```

## 實驗 1-1—C 語言

```
#include "c4mlib.h"
#define length 200
//sin
#define setA_INIT 1
#define setB_INIT 0.75
#define setC_INIT 0.5
#define setD_INIT 0.25
#define setx0_INIT 0
//cos
// #define setA_INIT 1
// #define setB_INIT -1
// #define setC_INIT 1
// #define setD_INIT -1
// #define setx0_INIT 1
#define set_INIT \
{ \
    setA_INIT, setB_INIT, setC_INIT, setD_INIT, setx0_INIT \
}
struct init
{
    float A;
    float B;
    float C;
    float D;
    float x0;
} set = set_INIT;

void iteration(int k);
float x[length + 1], u[length], y[length];
int main()
{
    C4M_DEVICE_set();

    printf("Enter A , B , C , D , x0\n");
    HMI_snput_struct("f32_5", sizeof(set), &set);
    HMI_snget_struct("f32_5", sizeof(set), &set);
```

```

    printf("A=%3.2f B=%3.2f C=%3.2f D=%3.2f x0=%3.2f\n", set.A, set.B,
set.C, set.D, set.x0);
    x[0] = set.x0;

    printf("Enter u(k)\n");
    HMI_snget_matrix(8, 1, length, &u); //8 f32
    iteration(0);
    printf("Output y(k)\n");
    HMI_snput_matrix(8, 1, length, &y);
    printf("End\n");
    return 0;
}

void iteration(int k)
{
    if (k != length)
    {
        x[k + 1] = set.A * x[k] + set.B * u[k];
        y[k] = set.C * x[k] + set.D * u[k];
        iteration(k + 1);
    }
}

```

### 實驗 1-1—matlab

```

clear; clc; close;

load sin.mat;
load cos.mat;
load output_sin.mat;
load output_cos.mat;

hold on;
t = linspace(-0.5, 0.5, 200);
%sin
plot(t, sin);
plot(t, output_sin);
%cos
% plot(t, cos);

```

```

% plot(t, output_cos);

xlabel('時間[s]');
ylabel('軸度');

legend('輸入', '輸出')

hold off;
%sin
saveas(gcf, 'EX1A', 'jpeg');
%cos
% saveas(gcf, 'EX1B', 'jpeg');

```

## 實驗 1-2—C 語言

同實驗一 1-1

## 實驗 1-2—matlab

```

clear; clc; close;
% fclose(instrfind);

[port] = remo_open(5);

[msg] = remo_get_msg(port);
disp(msg); %Enter A , B , C , D , x0

[data] = remo_snget_struct(port);
disp(data.field1); %1.000 0.7500 0.5000 0.25000 0

remo_snput_struct(port, data);

[msg] = remo_get_msg(port);
disp(msg); %A=1.000 B=0.7500 C=0.5000 D=0.25000 x0=0

[msg] = remo_get_msg(port);
disp(msg); %Enter u(k)

load sin.mat
remo_snput_matrix(port, sin);

```

```
[msg] = remo_get_msg(port);  
disp(msg); %Output y(k)
```

```
[output_sin] = remo_snget_matrix(port);
```

```
remo_close(port);  
disp('Finish Send!');  
%%  
%fclose(instrfind);
```

```
[port] = remo_open(5);
```

```
[msg] = remo_get_msg(port);  
disp(msg); %Enter A , B , C , D , x0
```

```
[data] = remo_snget_struct(port);  
disp(data.field1); %1 -1 1 -1 1
```

```
remo_snput_struct(port, data);
```

```
[msg] = remo_get_msg(port);  
disp(msg); %A=1 B=-1 C=1 D=-1 x0=1
```

```
[msg] = remo_get_msg(port);  
disp(msg); %Enter u(k)
```

```
load cos.mat  
remo_snput_matrix(port, cos);
```

```
[msg] = remo_get_msg(port);  
disp(msg); %Output y(k)
```

```
[output_cos] = remo_snget_matrix(port);
```

```
remo_close(port);  
disp('Finish Send!');  
%%
```

```

t = linspace(-0.5, 0.5, 200);
hold on;
plot(t, sin);
plot(t, output_sin);
xlabel('時間[s]');
ylabel('軸度');
legend('輸入', '輸出')
saveas(gcf, 'EX2A', 'jpeg');
hold off;
close;
hold on;
plot(t, cos);
plot(t, output_cos);
xlabel('時間[s]');
ylabel('軸度');
legend('輸入', '輸出')
saveas(gcf, 'EX2B', 'jpeg');
hold off;

```

### 三、實驗數據

```

>> Enter A , B , C , D , x0
>> ~GS, f32_5
<< ~ACK
(log: Get f32_5 struct data.)
>> ~PS, f32_5
<< ~BZ
<< ~Ready
(log: Send struct data.)
>> ~ACK
>> A=1.00 B=0.75 C=0.50 D=0.25 x0=0.00
>> Enter u(k)
>> ~PM, f32_1x200
<< ~BZ
<< ~Ready
(log: Send matrix data.)
>> ~ACK
>> Output y(k)
>> ~GM, f32_1x200
<< ~ACK
(log: Get float32_1x200 matrix data.)
>> End

```

```

>> Enter A , B , C , D , x0
>> ~GS, f32_5
<< ~ACK
(log: Get f32_5 struct data.)
>> ~PS, f32_5
<< ~BZ
<< ~Ready
(log: Send struct data.)
>> ~ACK
>> A=1.00 B=-1.00 C=1.00 D=-1.00 x0=1.00
>> Enter u(k)
>> ~PM, f32_1x200
<< ~BZ
<< ~Ready
(log: Send matrix data.)
>> ~ACK
>> Output y(k)
>> ~GM, f32_1x200
<< ~ACK
(log: Get float32_1x200 matrix data.)
>> End

```

HMI介面

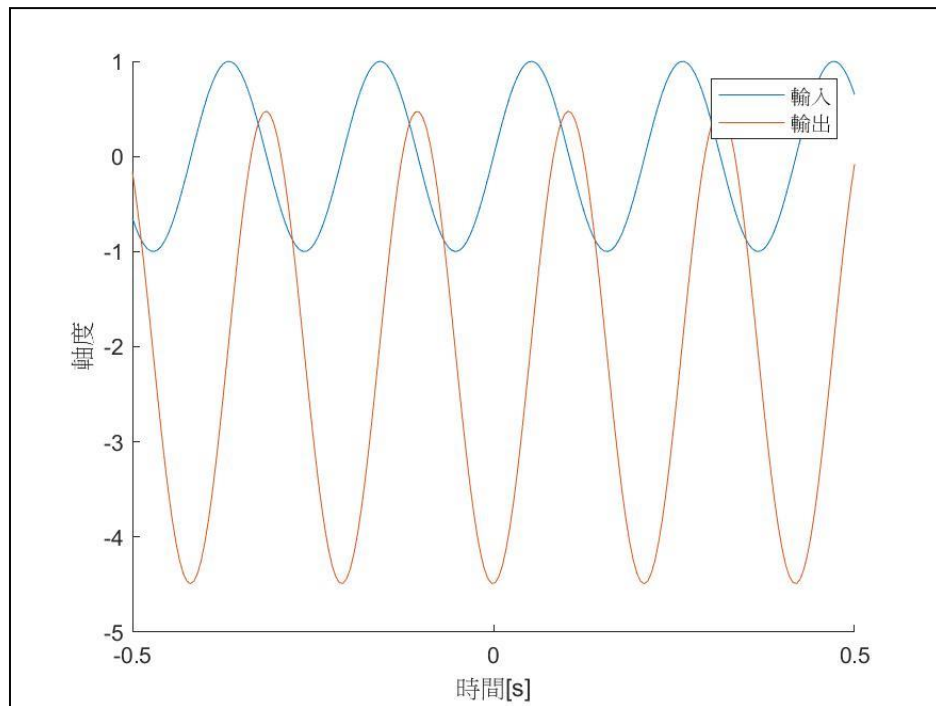


## 1. 實驗照片

### 2. 實驗數據

(1) 輸入  $1 \cdot \sin(30 \cdot t + 0) (\text{rad})$

$A=1$  ,  $B=0.75$  ,  $C=0.5$  ,  $D=0.25$  ,  $x(0)=0$



(2) 輸入  $1 \cdot \cos(60 \cdot t + 2) (\text{rad})$

$A=1$  ,  $B=-1$  ,  $C=1$  ,  $D=-1$  ,  $x(0)=1$

