Assignment 4 of CISC 2002

ZHANG Huakang/DB92760

March 16, 2021

1

1.1

```
clear
x=[2,4,6,8,10,12];
y=[2,4,4,5,5,7];
a=[1,1,1,1,1,1];
A=[x*x',x*a';x*a',6];
b=[x*y';y*a'];
answer=A\b;
disp(answer);
```

Listing 1: Code

```
    0.4143
    1.6000
```

Listing 2: Output

We can get the function

$$f(x) = 0.4143x + 1.6000$$

1.2

$$\begin{aligned} f(14) =& 0.4143 \times 14 + 1.600 \\ =& 7.4002 \end{aligned}$$

1.3

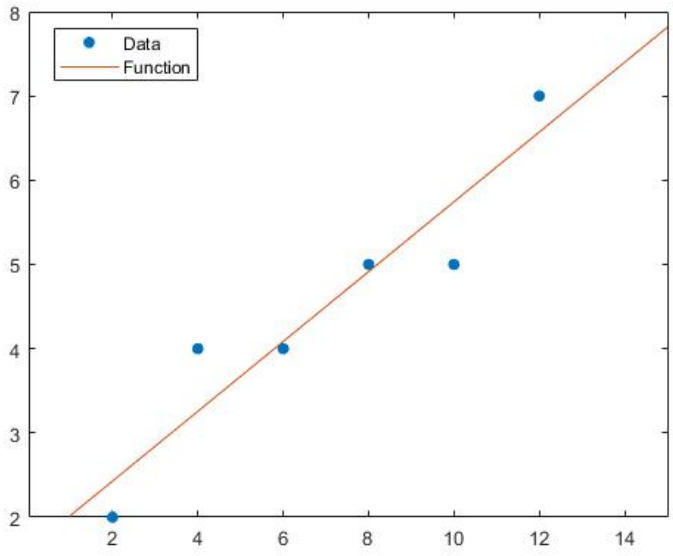

Figure 1: Figure

2

2.1

$$y = Ce^{Ax}$$
$$\log y = \log C + Ax$$

```
clear

x=2.3:0.1:2.8;
y=[4.7873,4.7079,5.3873,5.2038,6.0311,6.4525];
a=[1,1,1,1,1,1];

z=log(y);

A=[x*x',x*a';x*a',6];
b=[x*z';z*a'];
answer=A\b;
disp(answer)
disp(exp(answer(2)))
```

Listing 3: Code

```
    0.6288
    0.0815

    1.0849
```

Listing 4: Output

We can get

$$\begin{aligned} A &= 0.6288 \\ C &= e^{\beta} \\ &= 1.0849 \end{aligned}$$

2.2

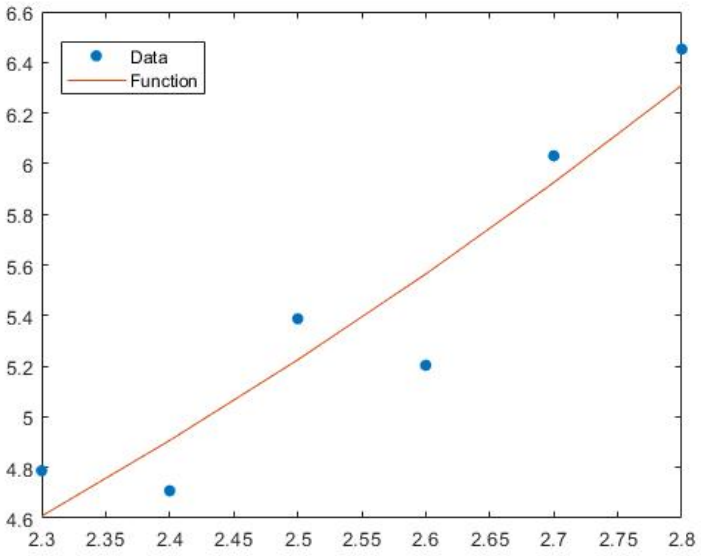

Figure 2: Figure

3

3.1

```
clear
x=0.4:0.5:5.9;
y=[0.7486,0.2931, 0.9360 ,0.6443 ,1.4025, 0.4456 ,0.0892 ,-0.9523
    ,-1.0688 ,-1.0506 ,-0.4982 ,-0.4433];
a=[1,1,1,1,1,1,1,1,1,1,1,1];
z=sin(x);
A=[z*z',z*a';z*a',6];
b=[z*y';y*a'];
answer=A\b;
disp(answer)
```

Listing 5: Code

```
    1.0077
    0.0918
```

Listing 6: Output

$$c = 1.0077$$
$$y = 1.0077 \sin(x)$$

3.2

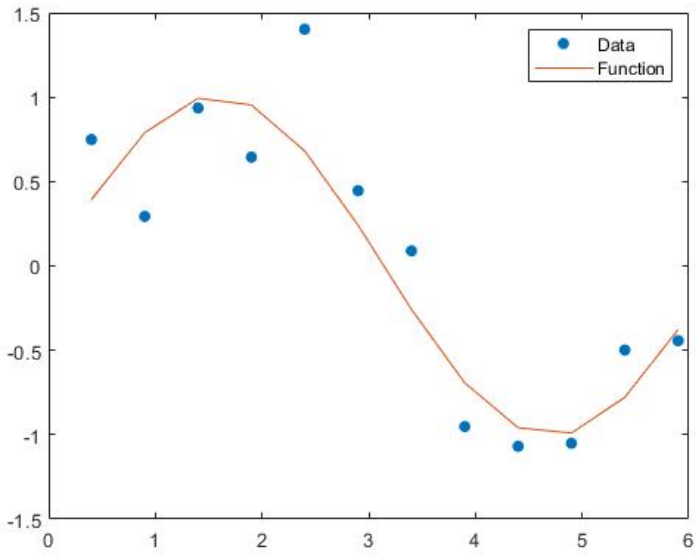

Figure 3: Figure

4

4.1

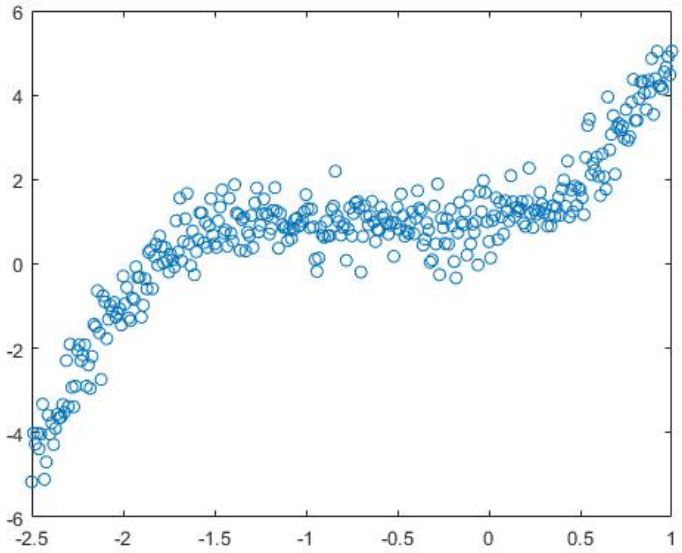

Figure 4: Figure

4.2

$$f_1(x) = 1$$
$$f_2(x) = x$$
$$f_3(x) = x^2$$
$$f_4(x) = x^3$$

4.3

```
clear
load A4Q4data
c1=(x+1-x).';
c2=x.';
c3=(x.^2).';
c4=(x.^3).';
A=[c1,c2,c3,c4];
c=A\y.'
```

Listing 7: Code

```
c =

    0.9156
    0.8796
    2.1602
    1.0880
```

Listing 8: Output

$$y = 0.9156 + 0.8796x + 2.1602x^2 + 1.0880x^3$$

4.4

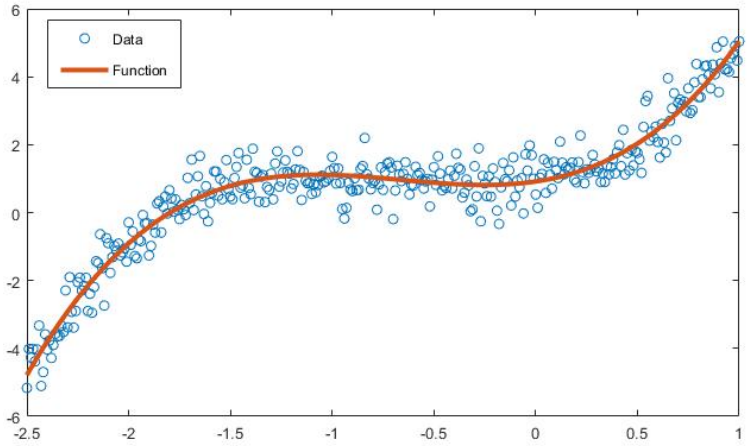

Figure 5: Figure