问题一：

计算判断矩阵特征向量

>> A=[1 1/2 1/3 1/5

2 1 3 1/3

3 1/3 1 1/2

5 3 2 1];

>> [U V]=eig(A);

lambda=V(1);

n=size(A,1);RI=1.12;

CI=(lambda-n)/(n-1);

Result=CI/RI

Result =

0.0891

>> w=U(:,1);

w=w'/sum(w);

disp(w)

0.0863 0.2612 0.1769 0.4756

中国主要大城市各月平均气温（度）

北京：

>> x=[ -4.6, -2.2,4.5,13.1, 19.8,24.0,25.8, 24.4,19.4,12.4,4.1,-2.7];

>> avg=sum(x)/12

avg =

11.5000

天津：

>> x=[-4.0,-1.6,5.0,13.2,20.0,24.1,26.4,25.5,20.8,13.6,5.2,-1.6];

>> avg=sum(x)/12

avg =

12.2167

上海：

>> x=[3.5,4.6,8.3,14.0,18.8,23.3,27.8,27.7,23.6,18.0,12.3,6.2];

>> avg=sum(x)/12

avg =

15.6750

南京：

>> x=[2.0,3.8,8.4,14.8,19.9,24.5,28.0,27.8,22.7,16.9,10.5,4.4];

>> avg=sum(x)/12

avg =

15.3083

武汉：

>> x=[3.0,5.0,10.0,16.1,21.3,25.7,28.8,28.3,23.3,17.5,11.1,5.4];

>> avg=sum(x)/12

avg =

16.2917

温度评分标准：

北京：

>> x=[ -4.6, -2.2,4.5,13.1, 19.8,24.0,25.8, 24.4,19.4,12.4,4.1,-2.7];

>> a1=length(find(x<=0));

>> a2=length(find(((x>=1&x<=6)|(x>=36))));

>> a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

>> a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

>> a5=length(find(((x>=19&x<=24))));

>> avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

25

天津：

>> x=[-4.0,-1.6,5.0, 13.2,20.0,24.1,26.4,25.5,20.8,13.6,5.2,-1.6];

>> a1=length(find(x<=0));

>> a2=length(find(((x>=1&x<=6)|(x>=36))));

>> a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

>> a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

>> a5=length(find(((x>=19&x<=24))));

>> avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

27.5000

上海：

>> x=[3.5,4.6,8.3,14.0,18.8,23.3,27.8,27.7,23.6,18.0,12.3,6.2];

>> a1=length(find(x<=0));

>> a2=length(find(((x>=1&x<=6)|(x>=36))));

>> a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

>> a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

>> a5=length(find(((x>=19&x<=24))));

>> avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

27.5000

南京：

>> x=[2.0,3.8,8.4,14.8,19.9,24.5,28.0,27.8,22.7,16.9,10.5,4.4];

>> a1=length(find(x<=0));

>> a2=length(find(((x>=1&x<=6)|(x>=36))));

>> a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

>> a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

>> a5=length(find(((x>=19&x<=24))));

>> avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

31.6667

武汉：

>> x=[3.0,5.0,10.0,16.1,21.3,25.7,28.8,28.3,23.3,17.5,11.1,5.4];

>> a1=length(find(x<=0));

>> a2=length(find(((x>=1&x<=6)|(x>=36))));

>> a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

>> a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

>> a5=length(find(((x>=19&x<=24))));

>> avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

35

湿度柱状图：

>> x=[1 2 3 4 5 6 7 8];

>> y=[20,30,40,45,50,40,30,20];

>> bar(x,y)

>> set(gca,'xticklabel',{'<=30%','30-40%','40-50%','50-60%','60-70%','70-75%','75-80%','>=80%'});

>> title('不同湿度段建立评价标准')

>> xlabel('湿度')

>> ylabel('分数')

温度柱状图：

>> x=[1 2 3 4 5 6 7 8];

>> y= [10,20,30,40,50,40,30,20];

>> bar(x,y)

>> set(gca,'xticklabel',{'<=0℃','1-6℃','7-12℃','13-18℃','19-24℃','25-30℃','31-36℃','>=36℃'});

>> title('不同温度段建立评价标准')

>> xlabel('温度')

>> ylabel('分数')

湿度评分标准：

北京：

>> x=[38,34,31,36,42,54,69,65,62,70,62,56];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>=30&x<=40)|(x>=75&x<=80)));

>> a3=length(find((x>=40&x<=50)|(x>=70&x<=75)));

>> a4=length(find(x>=50&x<=60));

>> a5=length(find(x>=60&x<=70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

45

天津：

>> x=[48,42,40,42,48,59,74,75,65,70,66,68];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

41.2500

上海：

>> x=[72,64,68,75,76,83,75,71,77,80,79,75];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

33.3333

南京：

>> x=[72,59,63,73,73,81,78,70,71,83,79,73];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

36.2500

武汉：

>> x=[82,72,73,83,81,84,81,77,70,85,86,82];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

25.8333

交通噪声标准函数公式推导：

>> x=[50,55,60,65,70];

>> y=[100,90,80,70,60];

>> p=polyfit(x,y,1)

p =

-2.0000 200.0000

城市区域噪声评分标准函数公式推导：

>> x=[40,55];

>> y=[100,60];

>> p=polyfit(x,y,1)

p =

-2.6667 206.6667

先定义一个计算交通噪声分数的函数zaosheng1.m文件如下:

function y=zaosheng1(x)

y=-2.0000\*x+200.0000;

end

计算具体分数：

2016年各城市交通噪声分数：

北京：

>> y=zaosheng1(69.3)

y =

61.4000

天津：

>> y=zaosheng1(67.9)

y =

64.2000

上海：

>> y=zaosheng1(69.7)

y =

60.6000

南京：

>> y=zaosheng1(67.9)

y =

64.2000

武汉：

>> y=zaosheng1(67.1)

y =

65.8000

2016年各城市城市区域噪声分数：

北京：

>> y=zaosheng2(54.3)

y =

61.8649

天津：

>> y=zaosheng2(54.1)

y =

62.3982

上海：

>> y=zaosheng2(56.4)

y =

56.2648

南京：

>> y=zaosheng2(54.0)

y =

62.6649

武汉：

>> y=zaosheng2(55.9)

y =

57.5982

问题三：

北京十年温度分数：

2016年：

>> x=[-4.2 1.4 9.4 16.9 21.5 25.9 27.4 27.5 22.2 13.4 4.3 0.3];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

31.6667

2015年：

>> x=[-0.6 1.3 8.8 15.5 21.5 24.9 26.8 26.7 21.0 14.7 3.6 0.2];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

28.3333

2014年：

>> x=[-0.6 -0.4 10.1 17.1 22.2 25.1 28.1 26.3 21.0 14.0 6.4 -0.5];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

30

2013年：

>> x=[-4.7 -1.4 6.2 12.6 21.9 23.8 27.4 27.3 20.7 13.6 6.3 0.1];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

24.1667

2012年：

>> x=[-3.6 -1.3 5.9 16.2 22.8 25.0 27.4 26.0 21.1 14.6 4.3 -4.2];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

30.8333

2011年：

>> x=[-4.5 -0.1 8.1 15.2 21.3 26.4 27.5 26.4 20.2 14.2 7.1 -1.0];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

32.5000

2010年：

>> x=[-4.8 -1.0 4.1 11.2 21.7 24.7 28.6 26.5 21.3 13.6 5.8 -1.0];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

26.6667

2009年：

>> x=[-3.0 1.0 7.0 15.9 22.9 26.2 27.0 25.7 21.1 15.3 2.2 -2.3];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

32.5000

2008年：

>> x=[-3.0 0.6 9.1 15.8 20.3 23.4 27.2 26.0 21.0 14.5 6.3 -1.0];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

30

2007年：

>> x=[-1.5 3.7 6.2 15.2 22.6 26.2 26.9 26.6 22.4 13.6 5.6 0.5];

>> a1=length(find(x<=0));

a2=length(find(((x>=1&x<=6)|(x>=36))));

a3=length(find(((x>=7&x<=12)|(x>=31&x<=36))));

a4=length(find(((x>=13&x<=18)|(x>=25&x<=30))));

a5=length(find(((x>=19&x<=24))));

avg=(a1\*10+a2\*20+a3\*30+a4\*40+a5\*50)/12

avg =

29.1667

北京十年湿度分数：

2016年：

>> x=[38,34,31,36,42,54,69,65,62,70,62,56];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

40.8333

2015年：

>> x=[43,42,34,47,44,56,64,64,68,56,77,64];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

>> a3=length(find((x>40&x<=50)|(x>=70&x<75)));

>> a4=length(find(x>50&x<=60));

>> a5=length(find(x>60&x<70));

>> avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

42.5000

2014年：

>> x=[45,55,37,45,40,59,61,62,66,65,52,34];

>> a1=length(find(x<=30|x>=80));

>> a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

42.0833

2013年：

>> x=[61 51 45 39 47 71 71 69 68 60 42 40];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

41.6667

2012年：

>> x=[44 30 40 39 43 60 71 71 60 54 51 49];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

38.3333

2011年：

>> x=[26 51 25 36 37 52 67 72 60 62 56 47];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

38.3333

2010年：

>> x=[43 47 47 43 45 60 65 64 63 58 44 33];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

42.5000

2009年：

>> x=[37 52 39 43 44 45 66 70 66 49 59 42];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

40.8333

2008年：

>> x=[40 30 39 53 51 67 70 69 68 58 44 38];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

39.5833

2007年：

>> x=[44 47 56 35 37 57 70 69 65 63 54 51];

>> a1=length(find(x<=30|x>=80));

a2=length(find((x>30&x<=40)|(x>=75&x<80)));

a3=length(find((x>40&x<=50)|(x>=70&x<75)));

a4=length(find(x>50&x<=60));

a5=length(find(x>60&x<70));

avg=(a1\*20+a2\*30+a3\*40+a4\*45+a5\*50)/12

avg =

42.5000

十年间北京噪声程序如下：

>> y=zaosheng1(69.3)

y =

61.4000

>> y=zaosheng1(69.3)

y =

61.4000

>> y=zaosheng1(69.1)

y =

61.8000

>> y=zaosheng1(69.2)

y =

61.6000

>> y=zaosheng1(69.6)

y =

60.8000

>> y=zaosheng1(70.0)

y =

60

>> y=zaosheng1(69.8)

y =

60.4000

>> y=zaosheng1(69.4)

y =

61.2000

>> y=zaosheng1(69.9)

y =

60.2000

>> y=zaosheng2(54.3)

y =

61.8649

>> y=zaosheng2(53.3)

y =

64.5316

>> y=zaosheng2(53.6)

y =

63.7316

>> y=zaosheng2(53.8)

y =

63.1982

>> y=zaosheng2(54.0)

y =

62.6649

>> y=zaosheng2(53.7)

y =

63.4649

>> y=zaosheng2(54.2)

y =

62.1316

>> y=zaosheng2(54.1)

y =

62.3982

>> y=zaosheng2(53.6)

y =

63.7316

>> y=zaosheng2(54.1)

y =

62.3982

北京十年来温度和湿度评价总分折线图：

>> x=2007:2016;

y=[72.5 70.83 72.08 65.84 69.16 70.83 69.17 73.33 69.58 71.67];

>> plot(x,y);

>> axis([2007 2016 50 75])

>> title('北京十年来温度和湿度评价总分折线图')

xlabel('年份')

ylabel('温度及湿度总分')

北京十年来噪音平均分折线图：

>> x=2007:2016;

>> y=[61.63 62.97 62.77 62.50 62.13 62.63 61.07 61.40 62.47 61.30];

>> plot(x,y);

>> axis([2007 2016 50 70])

>> title('北京十年来噪音平均分折线图')

xlabel('年份')

ylabel('噪音平均分')

问题三气环境灰色预测模型程序：

syms a b;

c=[a b]';

A=[2.5976 0.2389 0.5410 0.8936 0.5506 0.0851 0.4007 0.6502 -0.4553 -0.9430];

B=cumsum(A); %原始数据累加

n=length(A);

for i=1:(n-1)

C(i)=(B(i)+B(i+1))/2; %生成累加矩阵

end

%计算待定参数的值

D=A;D(1)=[];

D=D';

E=[-C;ones(1,n-1)];

c=inv(E\*E')\*E\*D;

c=c';

a=c(1);b=c(2);

%预测后续数据

F=[];F(1)=A(1);

for i=2:(n+10) %只推测后10个数据，可以从此修改

F(i)=(A(1)-b/a)/exp(a\*(i-1))+b/a;

end

G=[];G(1)=A(1);

for i=2:(n+10) %只推测后10个数据，可以从此修改

G(i)=F(i)-F(i-1); %得到预测出来的数据

end

t1=2007:2016;

t2=2007:2026; %多10组数据

G

h=plot(t1,A,'o',t2,G,'-'); %原始数据与预测数据的比较

set(h,'LineWidth',1.5);