代码附录

第一问

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm;
        links(cabins,kinds):a;
        endsets
        data:
        V=117.3,140.76,105.57;
        M=6,8,4;

vv=7.592992,1.157625,5.71234,5.0673,2.40597,0.709632,0.214032,2.47,2.8704,1.5;
        mm=2.1,0.2,0.7,1.8,1.3,0.3,0.23,1.2,0.9,0.3;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(links(i,j):@gin(a(i,j)));
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm;
        links(cabins,kinds):a;
        endsets
        data:
        V=838.44,1321.776,691.028;
        M=8,12,6;

vv=7.592992,1.157625,5.71234,5.0673,2.40597,0.709632,0.214032,2.47,2.8704,1.5;
        mm=2.1,0.2,0.7,1.8,1.3,0.3,0.23,1.2,0.9,0.3;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(links(i,j):@gin(a(i,j)));
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm;
```

```
        links(cabins,kinds):a;
        endsets
        data:
        V=2038.14,2501.2,1703.52;
        M=10,16,8;

vv=7.592992,1.157625,5.71234,5.0673,2.40597,0.709632,0.214032,2.47,2.8704,1.5;
        mm=2.1,0.2,0.7,1.8,1.3,0.3,0.23,1.2,0.9,0.3;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(links(i,j):@gin(a(i,j)));
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
```

第二问

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=117.3,140.76,105.57;
        M=6,8,4;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,361,364,247,26,34,2993,617,205;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
```

```
        endsets
        data:
        V=838.44,1321.776,691.028;
        M=8,12,6;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,361,364,247,26,34,2993,617,205;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=2038.14,2501.2,1703.52;
        M=10,16,8;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,361,364,247,26,34,2993,617,205;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        #include<stdio.h>
        #include<math.h>
        int N(double x,double y,double a,double b);
        double ab[4][2]={1.05,1.05,1.32,0.64,0.98,0.42,1.5,1};
```

```
        double h[4]={1.05,0.84,0.52,1};//货物
        double AB[4][2]={1.356,2.338,2.891,2.338,1.36,2.338,2.135,2.643};
        double H[4]={1.8,2.338,1.9,2.0};//集装箱
        int x[4]={2,6,7,10};
        int y[4]={3,4,6,7};
        int main()
        {
            int a=0;
            double ae,be,he,ac,bc,hc;
            int i,j;
            int n=0;//单层货物数量
            int m=0;
            int l=0;
            int s=0;//记录最优集装箱
            double v=0;//记录当前集装箱体积利用率
            double v2=0;
            for(a=0;a<4;a++)
            {
                n=0;
                m=0;
                s=0;
                v=0;
                ae=ab[a][0];
                be=ab[a][1];
                he=h[a];
                for(i=0;i<4;i++)
                {
                    n=0;
                    l=0;
                    v2=0;
                    ac=AB[i][0];
                    bc=AB[i][1];
                    hc=H[i];
                    n=N(ae,be,ac,bc);
                    l=n*(int)(hc/he);
                    if(i==1||i==0)
                    {
                        v2=l*he*ae*be/(ac*bc*hc);
                        printf("第%d种货物放在第%d号箱子种时，最多放%d个，体积利用率
为%lf\n",x[a],y[i],l,v2);
                    }
                    if(i==2||i==3)
                    {
                        v2=n*ae*be/(ac*bc);
                        printf("第%d种货物放在第%d号箱子种时，最多放%d个，体积利用率
为%lf，放置高度为%lf\n",x[a],y[i],l,v2,he*(int)(hc/he));
                    }

                    if(i==1||i==0)
                    {
                        if(n*(int)(hc/he)*(ae*be*he)/(ac*bc*hc)>v)
                        {
                            v=n*(int)(hc/he)*ae*be*he/(ac*bc*hc);
                            m=n*(int)(hc/he);
                            s=i;
                        }
                    }
                    if(i==2||i==3)
```

```
                    {
                        if(n*(int)(hc/he)*(ae*be*he)/(ac*bc*he*(int)(hc/he))>v)
                        {
                            v=n*(int)(hc/he)*ae*be*he/(ac*bc*he*(int)(hc/he));
                            m=n*(int)(hc/he);
                            s=i;
                        }
                    }
                }
                printf("第%d种货物的最优集装箱选择为%d号集装箱，可以装%d个这种货物，体积利
用率为%lf\n",x[a],y[s],m,v);
            }
            printf("%d",N(0.98,0.42,1,2.6));
        }
        int N(double x,double y,double a,double b)
        {
            int z=0;
            if((x>a&&y>a)||(x>b&&y>b)||(x>a&&x>b)||(y>a&&y>b))
            {
                return 0;
            }
            else
            {
                if(a>=x&&b>=y)
                {
                    z=N(x,y,a-x,b)+N(x,y,x,b-y)+1;
                    if(N(x,y,a-x,y)+N(x,y,a,b-y)+1>z)
                    z=N(x,y,a-x,y)+N(x,y,a,b-y)+1;
                }
                if(b>=x&&a>=y)
                {
                    if(N(x,y,a-y,b)+N(x,y,y,b-x)+1>z)
                    z=N(x,y,a-y,b)+N(x,y,y,b-x)+1;
                    if(N(x,y,a-y,x)+N(x,y,a,b-y)+1>z)
                    z=N(x,y,a-y,x)+N(x,y,a,b-y)+1;
                }
                return z;
            }
        }
```

```
        #include<stdio.h>
        #include<math.h>
        double ab[4][2]={1.05,1.05,1.32,0.64,0.98,0.42,1.5,1};
        double h[4]={1.05,0.84,0.52,1};//货物
        double AB[4][2]={1.356,2.338,2.891,2.338,1.36,2.338,2.135,2.643};
        double H[4]={1.8,2.338,1.9,2.0};//集装箱
        int x[4]={2,6,7,10};
        int y[4]={3,4,6,7};
        int main()
        {
            int a=0;
            double ae,be,he,ac,bc,hc;
            int i,j;
            int n=0;//单层货物数量
            int m=0;
            int l=0;
            int s=0;//记录最优集装箱
```

```
            double v=0;//记录当前集装箱体积利用率
            double v2=0;
            for(a=0;a<4;a++)
            {
                n=0;
                m=0;
                s=0;
                v=0;
                ae=ab[a][0];
                be=ab[a][1];
                he=h[a];
                for(i=0;i<4;i++)
                {
                    n=0;
                    l=0;
                    v2=0;
                    ac=AB[i][0];
                    bc=AB[i][1];
                    hc=H[i];
                    for(j=0;ae*j<ac;j++)
                    {
                        if(j*(int)(bc/be)+(int)((ac-ae*j)/be)*(int)(bc/ae)>n)
                        n=j*(int)(bc/be)+(int)((ac-ae*j)/be)*(int)(bc/ae);
                    }
                    for(j=0;ae*j<bc;j++)
                    {
                        if(j*(int)(ac/be)+(int)((bc-ae*j)/be)*(int)(ac/ae)>n)
                        n=j*(int)(ac/be)+(int)((bc-ae*j)/be)*(int)(ac/ae);
                    }
                    l=n*(int)(hc/he);
                    if(i==1||i==0)
                    {
                        v2=l*he*ae*be/(ac*bc*hc);
                        printf("第%d种货物放在第%d号箱子种时，最多放%d个，体积利用率
为%lf\n",x[a],y[i],l,v2);
                    }
                    if(i==2||i==3)
                    {
                        v2=n*ae*be/(ac*bc);
                        printf("第%d种货物放在第%d号箱子种时，最多放%d个，体积利用率
为%lf，放置高度为%lf\n",x[a],y[i],l,v2,he*(int)(hc/he));
                    }
                    if(i==1||i==0)
                    {
                        if(n*(int)(hc/he)*(ae*be*he)/(ac*bc*hc)>v)
                        {
                            v=n*(int)(hc/he)*ae*be*he/(ac*bc*hc);
                            m=n*(int)(hc/he);
                            s=i;
                        }
                    }
                    if(i==2||i==3)
                    {
                        if(n*(int)(hc/he)*(ae*be*he)/(ac*bc*he*(int)(hc/he))>v)
                        {
                            v=n*(int)(hc/he)*ae*be*he/(ac*bc*he*(int)(hc/he));
                            m=n*(int)(hc/he);
                            s=i;
```

```
                        }
                    }
                }
                printf("第%d种货物的最优集装箱选择为%d号集装箱，可以装%d个这种货物，体积利用率为%lf\n",x[a],y[s],m,v);
            }
        }
```

```
h=cu(0,0,0,3,4,5);
xlabel('ac');
ylabel('bc');
zlabel('hc');
title('变量g');
function k=cu(x,y,z,a,b,c)
    k=0;
    t=0:0.01:1;
    f=zeros(1,101);
    g=ones(1,101);
    plot3(a*t+x*g,f+y*g,f+z*g);
    hold on;
    plot3(f+x*g,b*t+y*g,f+z*g);
    hold on;
    plot3(f+x*g,f+y*g,c*t+z*g);
    hold on;
    plot3(a*t+x*g,b*g+y*g,f+z*g);
    hold on;
    plot3(a*t+x*g,f+y*g,c*g+z*g);
    hold on;
    plot3(a*t+x*g,b*g+y*g,c*g+z*g);
    hold on;
    plot3(a*g+x*g,b*t+y*g,f+z*g);
    hold on;
    plot3(f+x*g,b*t+y*g,c*g+z*g);
    hold on;
    plot3(a*g+x*g,b*t+y*g,c*g+z*g);
    hold on;
    plot3(a*g+x*g,f+y*g,c*t+z*g);
    hold on;
    plot3(f+x*g,b*g+y*g,c*t+z*g);
    hold on;
    plot3(a*g+x*g,b*g+y*g,c*t+z*g);
    hold on;
end
```

第四问

```
sets:
cabins/1..3/:V,M;
kinds/1..10/:vv,mm,n;
links(cabins,kinds):a;
endsets
data:
V=117.3,140.76,105.57;
M=6,8,4;
```

```
vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=118,92,357,361,244,26,26,2833,458,458,147;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=838.44,1321.776,691.028;
        M=8,12,6;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=118,92,357,361,244,26,26,2833,458,458,147;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=2038.14,2501.2,1703.52;
        M=10,16,8;
```

```
vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=118,92,357,361,244,26,26,2833,458,458,147;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
a{1}=[120   119   117   120   122   119   119   120   120   119 119   120   119
  121   120   121   119   118   119   118 120   120   121   118   121   119
118   121   118   119 119 121   118   119   118   120   120   120   119   117
120   119   120   118   119   117   120   119   119   120];
a{2}=[   369   367   367   368   365   368   365   370   367   369 367   366
366   365   363   367   368   365   367   371 367   370   365   366   365   368
  366   370   367   368 366 367   373   367   368   367   367   369   368   367
370   366   371   369   368   369   369   367   368   369];
a{3}=[362   363   360   358   358   360   363   361   358   357 358   362   367
  361   366   361   358   362   364   361 364   359   359   361   365   362
359   352   363   366 362   361   360   366   361   361   359   360   361   362
362   361   359   361   357   363   360   365   362   362];
a{4}=[363   364   367   361   365   363   366   365   364   364 364   369   361
  365   367   362   366   363   361   360 365   360   363   362   367   366
365   363   367   366 365   369   364   365   363   365   367   367   366   360
364   365   365   366   365   364   366   361   365   360];
a{5}=[248   246   249   246   245   248   246   246   245   251 246   248   247
  245   247   246   245   252   247   247 248   248   247   247   248   247
247   250   248   248 249   249   250   249   247   243   245   243   249   249
249   249   243   249   248   250   247   248   247   248];
a{6}=[309   306   307   308   305   306   312   311   306   307 308   308   307
  307   308   307   309   309   307   304 306   309   310   305   306   308
307   309   306   309 304   308   306   307   307   304   308   306   305   307
311   306   309   307   308   310   305   308   306   309];
a{7}=[   556   546   558   664   702   476   641   518   531   688 559   697
556   563   745   380   542   651   533   618 698   547   800   670   604   566
  614   598   686   655 570 617   695   741   774   671   436   484   611   668
714   697   556   439   615   631   523   599   639   717];
a{8}=[ 2851        2837        3202        3031        3064        3106
 2924        2959        3007        2861 2995        3016        2764
 3013        2957        3115        2943        2983        3132        3031
3096        3037        2949        2928        3104        3005        3055
   3040        2978        2975 3173        2977        2867        3077
 3066        2871        2944        2904        2986        3050 2956
 2885        2936        3062        3250        2962        2910        3031
     2882        2910];
```

```
a{9}=[840   719   508   727   691   598   632   507   592   653 662   705   655
  693   684   560   529   548   624   735 754   537   608   641   684   529
620   628   493   690 627   496   613   752   577   753   326   617   602   579
  633   540   513   562   682   565   541   844   516   486 ];
a{10}=[1492        1081        1284        1394         961         889
 1410        1757         915        1280 1610        1106        1280
 1086        1329        1234        1050        1345        1343        1385
1224        1377        1219        1361        1129        1187        1012
   1045        1044         878 1002         922        1299        1234
 1209        1439         946        1367        1263        1332 1439
808        1416        1098        1041        1360        1299         974
   1481        1627];
for i=1:10
    b(i)=mean(a{i})-1.64*std(a{i});
    c(i)=mean(a{i})-0.53*std(a{i});
end
```

第五问

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=117.3,140.76,105.57;
        M=6,8,4;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,1
2.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,360,363,246,26,32,2941,566,186;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))
<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))
<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=838.44,1321.776,691.028;
        M=8,12,6;
```

```
vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,12.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,360,363,246,26,32,2941,566,186;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))<0.1;
        @for(links(i,j):@gin(a(i,j)));
```

```
        sets:
        cabins/1..3/:V,M;
        kinds/1..10/:vv,mm,n;
        links(cabins,kinds):a;
        endsets
        data:
        V=2038.14,2501.2,1703.52;
        M=10,16,8;

vv=7.592992,7.05019575,5.71234,5.0673,2.40597,10.9124769,5.9087368,2.47,2.8704,12.8742705;
        mm=2.1,0.95,0.7,1.8,1.3,3.75,4.31,1.2,0.9,1.95;
        n=119,92,360,363,246,26,32,2941,566,186;
        end data
        max=@sum(cabins(i):@sum(kinds(j):a(i,j)*vv(j)))/@sum(cabins(i):V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*vv(j))<=V(i));
        @for(cabins(i):@sum(kinds(j):a(i,j)*mm(j))<=M(i));
        @for(kinds(j):@sum(cabins(i):a(i,j))<=n(j));
        a(1,2)+a(2,2)+a(3,2)+a(1,6)+a(2,6)+a(3,6)+a(1,10)+a(2,10)+a(3,10)<=10;
        a(1,7)+a(2,7)+a(3,7)<=10;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(2,j)*mm(j))/M(2))<0.1;
        @abs(@sum(kinds(j):a(1,j)*mm(j))/M(1)-@sum(kinds(j):a(3,j)*mm(j))/M(3))<0.1;
        @abs(@sum(kinds(j):a(2,j)*mm(j))/M(2)-@sum(kinds(j):a(3,j)*mm(j))/M(3))<0.1;
        @for(links(i,j):@gin(a(i,j)));
```