

Contents

- [Question-1](#)
- [Question-2](#)
- [Question-3](#)
- [Question-4](#)

Question-1

```
clf
clc
clear all
format short
c=[6,11];
A=[2,1;1,2;0,1;1,0];
B=[104;76;0;0];
const=[1;1];
objective=1;
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end

for i=1:n-2
    y(i,:)=max(0,y(i,:));
    plot(x1,y(i,:), 'linewidth',4)
    hold on
end
hold on
pt=[0;0];
for i=1:size(A,1)
    A1=A(i,:);
    B1=B(i,:);
    for j=i+1:size(A,1)
        A2=A(j,:);
        B2=B(j,:);
        A3=[A1;A2];
        B3=[B1;B2];
        X3=A3\B3;
        if(X3>=0)
            pt= [pt X3];
        end
    end
end

X=pt';
X=unique(X, 'rows')
hold on

x1=X(:,1);
x2=X(:,2);
```

```

for i=1:n-2
    if(const(i)>0)
        ind=find(A(i,:)*X'>B(i));
        X(ind,:)=[];
    else
        ind=find(A(i,:)*X'<B(i));
        X(ind,:)=[];
    end
end

if(objective == 1)
    obj_val=c*X';
    [value, ind]=max(obj_val);
    fprintf("The max optimal value is : %f \n",value)
    fprintf("The max optimal point is : (%g,%g) \n",X(ind,:))
else
    obj_val=c*X';
    [value, ind]=min(obj_val);
    fprintf("The min optimal value is : %f \n",value)
    fprintf("The min optimal point is : (%g,%g) \n",X(ind,:))
end

X(ind,:);
Optimal=[X(ind,:) value];

x=X(:,1);
y=X(:,2);
scatter(X(:,1),X(:,2),'*')
hold on
k=convhull(x,y);
fill(x(k),y(k),'m')

xlim([0 max(x)+1])
ylim([0 max(y)+1])

xlabel('X-Axis')
ylabel('Y-Axis')
title('Feasible Region')

x=0:0.1:max(B);
for z=0:8:value
    y=(z-c(1)*x)/c(2);
    plot(x,y)
    hold on
    drawnow
    pause(0.001)
end
hold on

```

X =

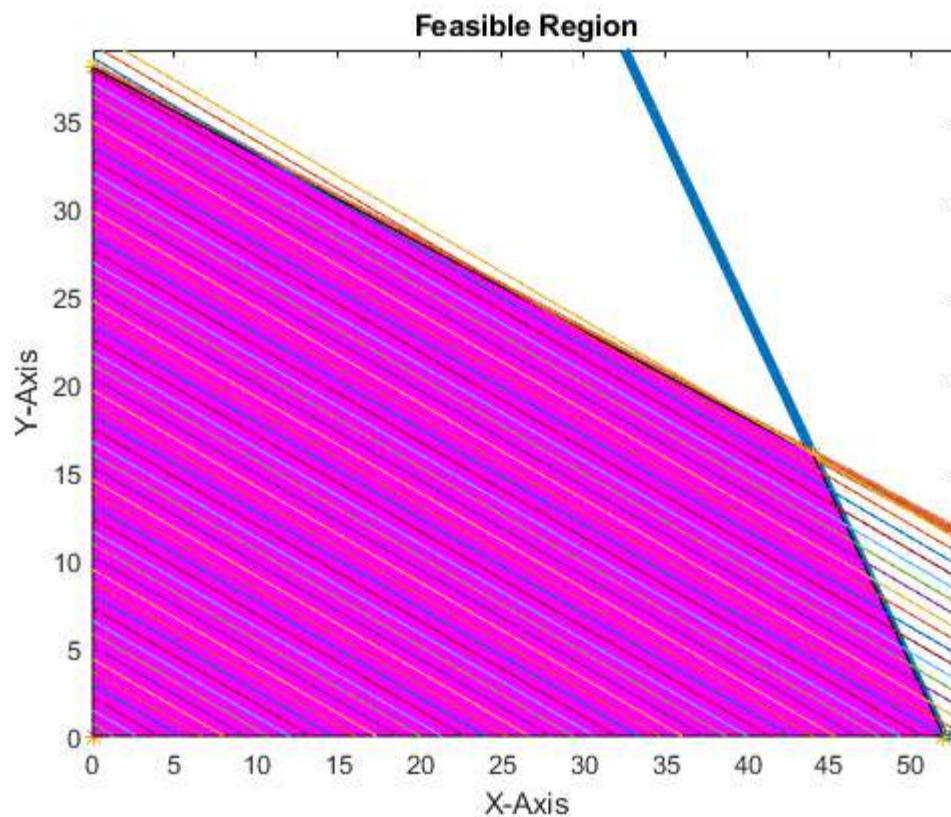
```

     0     0
     0    38
     0   104
    44    16
    52     0
    76     0

```

The max optimal value is : 440.000000

The max optimal point is : (44,16)



Question-2

```
clf
clc
clear all
format short
c=[5,8];
A=[1,2;1,1;0,1;1,0;0,1];
B=[200;150;60;0;0];
const=[1;1;1];
objective=1;
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end

for i=1:n-2
    y(i,:)=max(0,y(i,:));
    plot(x1,y(i,:), 'linewidth',4)
    hold on
end
hold on
pt=[0;0];
for i=1:size(A,1)
    A1=A(i,:);
```

```

B1=B(i,:);
for j=i+1:size(A,1)
    A2=A(j,:);
    B2=B(j,:);
    A3=[A1;A2];
    B3=[B1;B2];
    X3=A3\B3;
    if(X3>=0)
        pt= [pt X3];
    end
end
end

X=pt';
X=unique(X, 'rows')
hold on

x1=X(:,1);
x2=X(:,2);

for i=1:n-2
    if(const(i)>0)
        ind=find(A(i,:)*X'>B(i));
        X(ind,:)=[];
    else
        ind=find(A(i,:)*X'<B(i));
        X(ind,:)=[];
    end
end

if(objective == 1)
    obj_val=c*X';
    [value, ind]=max(obj_val);
    fprintf("The max optimal value is : %f \n",value)
    fprintf("The max optimal point is : (%g,%g) \n",X(ind,:))
else
    obj_val=c*X';
    [value, ind]=min(obj_val);
    fprintf("The min optimal value is : %f \n",value)
    fprintf("The min optimal point is : (%g,%g) \n",X(ind,:))
end

X(ind,:);
Optimal=[X(ind,:) value];

x=X(:,1);
y=X(:,2);
scatter(X(:,1),X(:,2), '*')
hold on
k=convhull(x,y);
fill(x(k),y(k), 'm')

xlim([0 max(x)+1])
ylim([0 max(y)+1])

xlabel('X-Axis')
ylabel('Y-Axis')
title('Feasible Region')

```

```

x=0:0.1:max(B);
for z=0:8:value
    y=(z-c(1)*x)/c(2);
    plot(x,y)
    hold on
    drawnow
    pause(0.001)
end
hold on

```

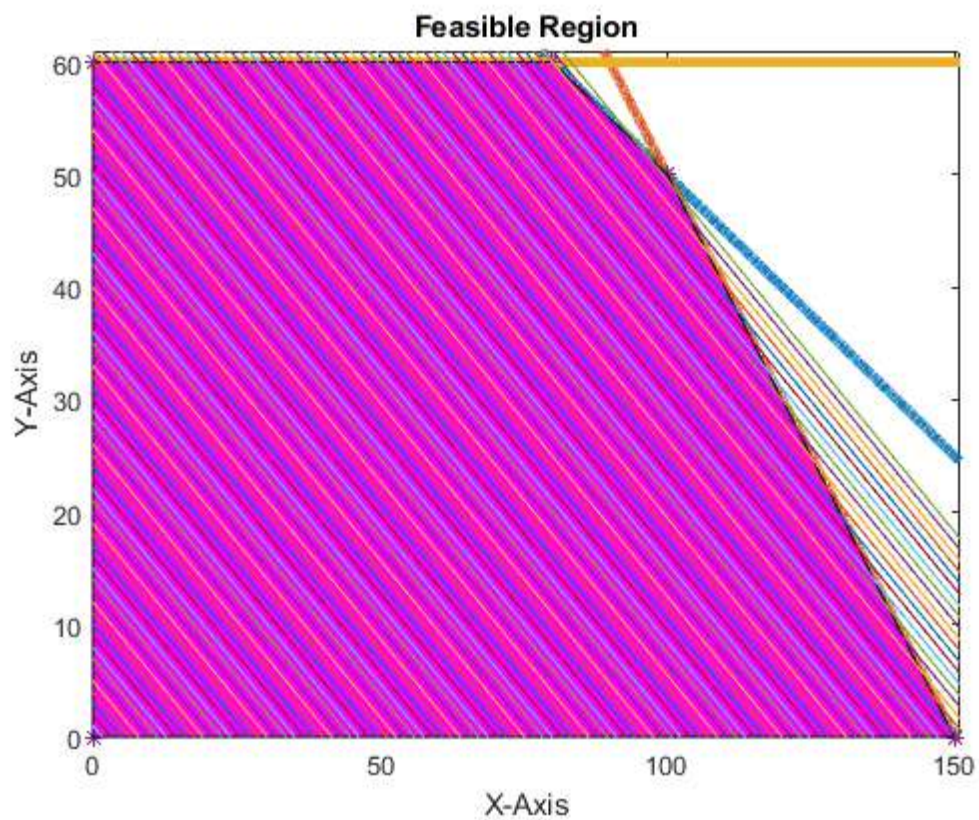
Warning: Matrix is singular to working precision.

X =

0	0
0	60
0	100
0	150
80	60
90	60
100	50
150	0
200	0
Inf	0

The max optimal value is : 900.000000

The max optimal point is : (100,50)



```

clf
clc
clear all
format short
c=[5,-1];
A=[1,1;2,5;0,1;1,0];
B=[2;8;0;0];
const=[1;1];
objective=1;
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end

for i=1:n-2
    y(i,:)=max(0,y(i,:));
    plot(x1,y(i,:), 'linewidth',4)
    hold on
end
hold on
pt=[0;0];
for i=1:size(A,1)
    A1=A(i,:);
    B1=B(i,:);
    for j=i+1:size(A,1)
        A2=A(j,:);
        B2=B(j,:);
        A3=[A1;A2];
        B3=[B1;B2];
        X3=A3\B3;
        if(X3>=0)
            pt= [pt X3];
        end
    end
end

X=pt';
X=unique(X, 'rows')
hold on

x1=X(:,1);
x2=X(:,2);

for i=1:n-2
    if(const(i)>0)
        ind=find(A(i,:)*X'>B(i));
        X(ind,:)=[];
    else
        ind=find(A(i,:)*X'<B(i));
        X(ind,:)=[];
    end
end

if(objective == 1)
    obj_val=c*X';
end

```

```

[value, ind]=max(obj_val);
fprintf("The max optimal value is : %f \n",value)
fprintf("The max optimal point is : (%g,%g) \n",X(ind,:))
else
    obj_val=c*X';
    [value, ind]=min(obj_val);
    fprintf("The min optimal value is : %f \n",value)
    fprintf("The min optimal point is : (%g,%g) \n",X(ind,:))
end
X(ind,:);
Optimal=[X(ind,:) value];

x=X(:,1);
y=X(:,2);
scatter(X(:,1),X(:,2), '*')
hold on
k=convhull(x,y);
fill(x(k),y(k), 'm')

xlim([0 max(x)+1])
ylim([0 max(y)+1])

xlabel('X-Axis')
ylabel('Y-Axis')
title('Feasible Region')

x=0:0.1:max(B);
for z=0:8:value
    y=(z-c(1)*x)/c(2);
    plot(x,y)
    hold on
    drawnow
    pause(0.001)
end
hold on

```

X =

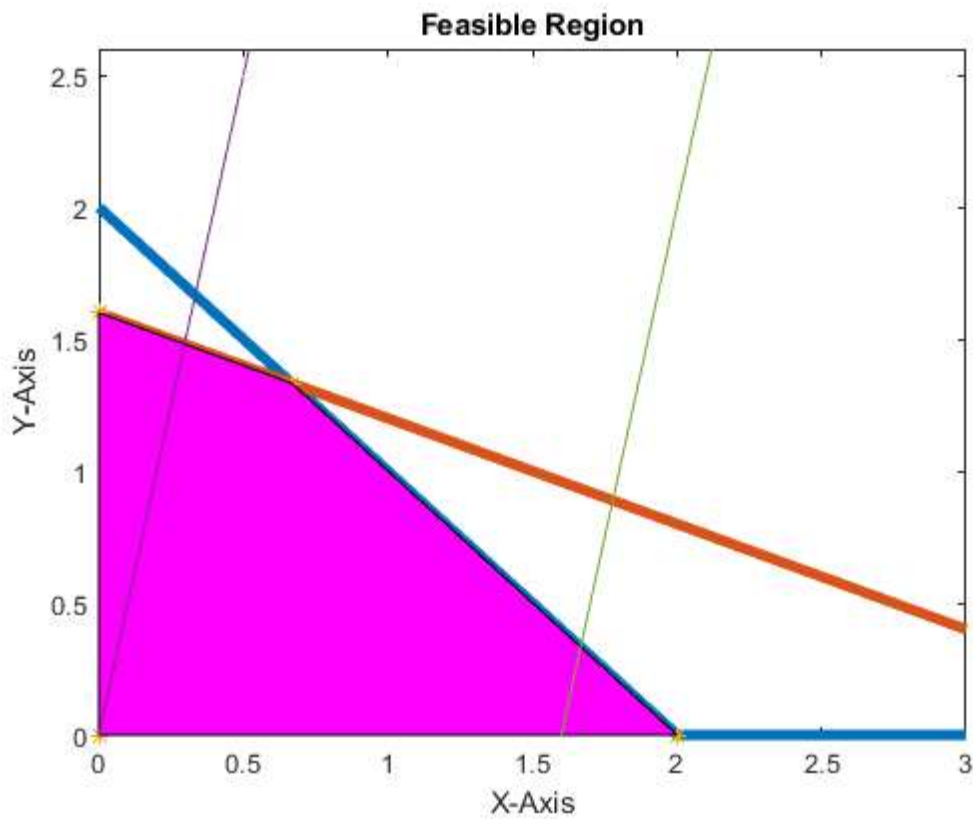
```

     0         0
     0    1.6000
     0    2.0000
  0.6667    1.3333
  2.0000         0
  4.0000         0

```

The max optimal value is : 10.000000

The max optimal point is : (2,0)



Question-4

```

clf
clc
clear all
format short
c=[40,24];
A=[20,50;80,50;0,1;1,0];
B=[480;720;0;0];
const=[-1;-1];
objective=-1;
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end

for i=1:n-2
    y(i,:)=max(0,y(i,:));
    plot(x1,y(i,:), 'linewidth',4)
    hold on
end
hold on
pt=[0;0];
for i=1:size(A,1)
    A1=A(i,:);
    B1=B(i,:);
    for j=i+1:size(A,1)
        A2=A(j,:);
        B2=B(j,:);
    end
end

```



```

        A3=[A1;A2];
        B3=[B1;B2];
        X3=A3\B3;
        if(X3>=0)
            pt= [pt X3];
        end
    end
end

X=pt';
X=unique(X,'rows')
hold on

x1=X(:,1);
x2=X(:,2);

for i=1:n-2
    if(const(i)>0)
        ind=find(A(i,:)*X'>B(i));
        X(ind,:)=[];
    else
        ind=find(A(i,:)*X'<B(i));
        X(ind,:)=[];
    end
end

if(objective == 1)
    obj_val=c*X';
    [value, ind]=max(obj_val);
    fprintf("The max optimal value is : %f \n",value)
    fprintf("The max optimal point is : (%g,%g) \n",X(ind,:))
else
    obj_val=c*X';
    [value, ind]=min(obj_val);
    fprintf("The min optimal value is : %f \n",value)
    fprintf("The min optimal point is : (%g,%g) \n",X(ind,:))
end
X(ind,:);
Optimal=[X(ind,:) value];

x=X(:,1);
y=X(:,2);
scatter(X(:,1),X(:,2), '*')
hold on
k=convhull(x,y);
fill(x(k),y(k), 'm')

xlim([0 max(x)+1])
ylim([0 max(y)+1])

xlabel('X-Axis')
ylabel('Y-Axis')
title('Feasible Region')

x=0:0.1:max(B);
for z=0:8:value
    y=(z-c(1)*x)/c(2);
    plot(x,y)
end

```

```

hold on
drawnow
pause(0.001)
end
hold on

```

X =

```

0      0
0      9.6000
0      14.4000
4.0000  8.0000
9.0000  0
24.0000 0

```

The min optimal value is : 345.600000

The min optimal point is : (0,14.4)

