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```
% Maximize Z = 5x2 - x1
% s.t. x1 + x2    2,
% 2x1 + 5x2    8,
% x1, x2    0
```

```
clc
clear all
format short
```

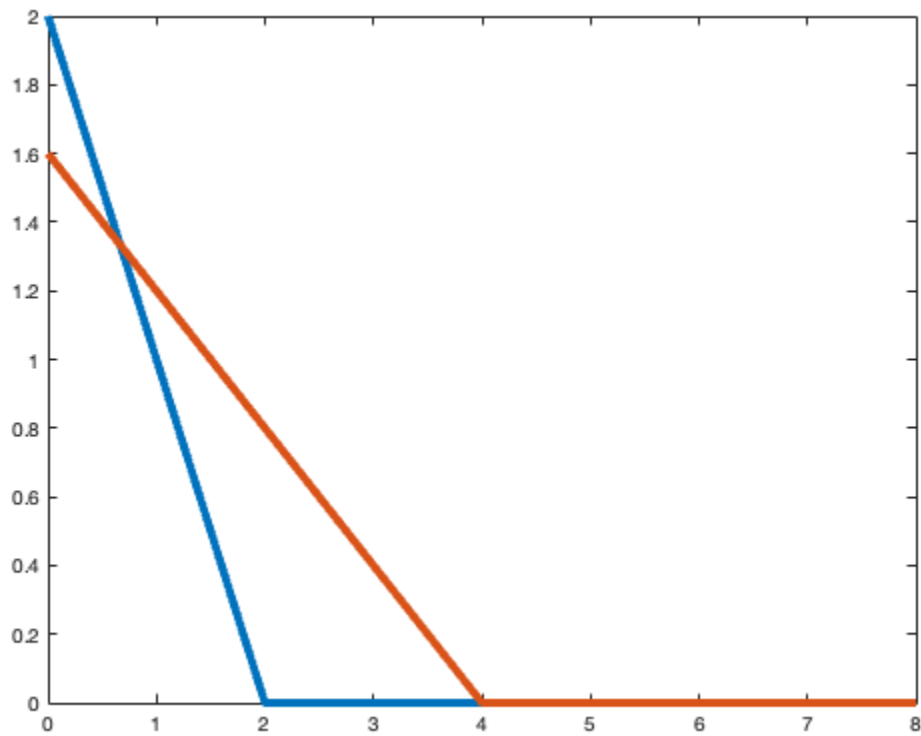
## Input parameters

```
c=[-1, 5]; %cost objective function
A=[1,1; 2,5; 0,1; 1,0];
B=[2; 8; 0; 0];
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2 %we take n-2 since we are also taking x1=0 and x2=0 as they have
no significance in our graph
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end
```

## Drawing the lines

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



## Finding the point of intersection

```
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=inv(A3)*B3
        % X3=A3\B3;
        if(X3>=0)%since the number of chairs can never be negative
            pt= [pt X3];
        end
    end
end
X=pt';
X=unique(X, 'rows')%solution
```

X3 =

```
0.6667
1.3333
```

---

`X3 =`

`2`  
`0`

`X3 =`

`0`  
`2`

`X3 =`

`4`  
`0`

`X3 =`

`0`  
`1.6000`

`X3 =`

`0`  
`0`

`X =`

<code>0</code>	<code>0</code>
<code>0</code>	<code>1.6000</code>
<code>0</code>	<code>2.0000</code>
<code>0.6667</code>	<code>1.3333</code>
<code>2.0000</code>	<code>0</code>
<code>4.0000</code>	<code>0</code>

## Keep only Feasible Points

```
x1=X(:,1);  
x2=X(:,2);  
  
for i=1:n-2  
    ind=find(A(i,:)*X'>B(i))  
    X(ind,:)=[]  
end
```

---

*ind* =

6

*X* =

0	0
0	1.6000
0	2.0000
0.6667	1.3333
2.0000	0

*ind* =

3

*X* =

0	0
0	1.6000
0.6667	1.3333
2.0000	0

## Evaluate The Objective Function Value

```
obj_val=c*X';  
[value, ind]=max(obj_val);  
value;  
X(ind,:)  
Optimal=[X(ind,:) value];
```

*ans* =

0 1.6000

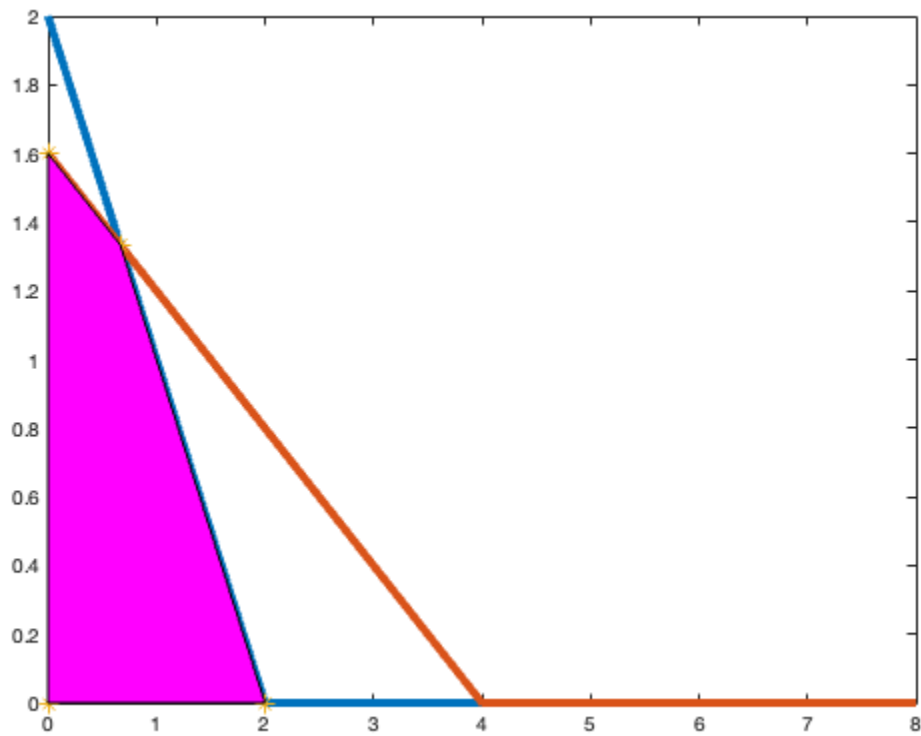
## Shaded feasible region

```
x=X(:,1);  
y=X(:,2);  
scatter(X(:,1),X(:,2),'*')  
hold on  
k=convhull(x,y)%the shaded region where a and y is satisfied  
fill(x(k),y(k),'m')
```

*k* =

---

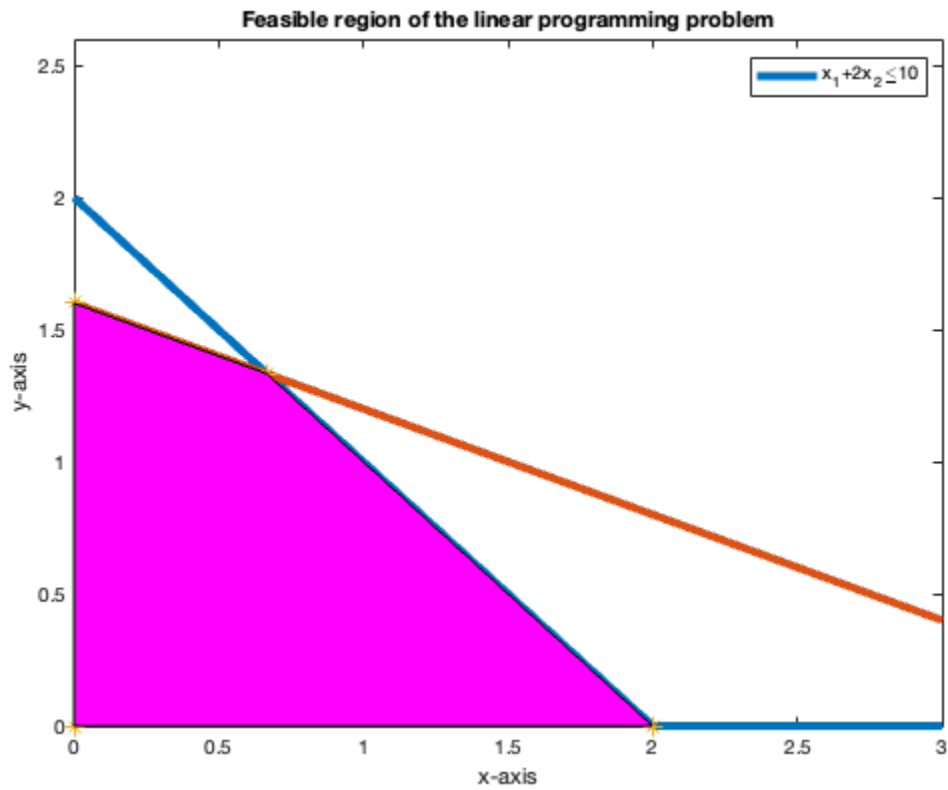
1  
4  
3  
2  
1



## setting the axes

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

xlabel('x-axis')
ylabel('y-axis')
title('Feasible region of the linear programming problem')
legend('x_1+2x_2\leq10')
```



*Published with MATLAB® R2023b*