MAT-2003

LAB – 5

SUBMITTED BY : SRIHARSHITHA DEEPALA

REG NO : 19BCD7246

SLOT : L6

QUESTION:

- Maximize $Z = x_1 + 5x_2$

Subject to

$$4x_1 + 4x_2 \leq 6$$
$$x_1 + 3x_2 \geq 2$$
$$x_1, x_2 \geq 0$$

```
%% D. Sriharshitha
%% 19BCD7246
%% LAB-5
%% Slot - L6


V={'x1','x2','s1','s2','A1','Sol'}
```

```
V = 1×6 cell
'x1'        'x2'        's1'        's2'        'A1'        'Sol'
```

```
M=1000;
C = [1 5 0 0 -M 0];
A=[4 4 1 0 0 6; 1 3 0 -1 1 2];
s=eye(size(A,1));
BV=[];
for j=1:size(s,2)
   for i=1:size(A,2)
     if A(:,i)==s(:,j)
        BV=[BV i];
     end
   end
end
ZjCj=C(BV)*A-C;
ZCj=[ZjCj;A];
BigM= array2table(ZCj);
BigM.Properties.VariableNames(1:size(ZCj,2))=V
```

BigM = 3×6 table

	x1	x2	s1	s2	A1	Sol
1	-1001	-3005	0	1000	0	-2000
2	4	4	1	0	0	6
3	1	3	0	-1	1	2

```
m=true;
while m
  ZC=ZjCj(:,1:end-1);
  if any(ZC<0)
    fprintf('The current Basic Feasible solution is not optimal\n');
    [Entval,pvt_col]=min(ZC);
    fprintf('Entering Column = %d\n',pvt_col);
    sol=A(:,end);
    Column=A(:,pvt_col);
    if all(Column<=0)
      fprintf('UNBOUNDED! ');
    else
     for i=1:size(Column,1)
       if Column(i)>0
         ratio(i)=sol(i)./Column(i);
       else
         ratio(i)=inf;
       end
```

```
      end
      [minR,pvt_row]=min(ratio);
      fprintf('Leaving Row = %d\n', pvt_row);
  end
  BV(pvt_row)=pvt_col;
  B=A(:,BV);
  A=inv(B)*A;
  ZjCj=C(BV)*A-C;
  ZCj=[ZjCj;A];
  BigM=array2table(ZCj);
  BigM.Properties.VariableNames(1:size(ZCj,2))=V
  else
    m=false;
    fprintf('The Optimal solution is reached ');
    Final_BFS = zeros(1,size(A,2));
    Final_BFS(BV) =A(:,end);
    Final_BFS(end)=sum(Final_BFS.*C);
    OptimalBFS=array2table(Final_BFS);
    OptimalBFS.Properties.VariableNames(1:size(OptimalBFS,2))=V
   end
end
```

```
The current Basic Feasible solution is not optimal
Entering Column = 2
Leaving Row = 2
BigM = 3×6 table
```

	x1	x2	s1	s2	A1	Sol
1	0.6667	0	0	-1.6667	1.0017e+03	3.3333
2	2.6667	0.0000	1	1.3333	-1.3333	3.3333
3	0.3333	1.0000	0	-0.3333	0.3333	0.6667

```
The current Basic Feasible solution is not optimal
Entering Column = 4
Leaving Row = 1
BigM = 3×6 table
```

	x1	x2	s1	s2	A1	Sol
1	4	0	1.2500	0	1000	7.5000
2	2	0	0.7500	1	-1	2.5000
3	1	1	0.2500	0	0	1.5000

```
The Optimal solution is reached
OptimalBFS = 1×6 table
```

	x1	x2	s1	s2	A1	Sol
1	0	1.5000	0	2.5000	0	7.5000