2018 mar/01 Aztec Refinery Bronson & Naadimuthu BigM = 100

MAX

c	Structural			Slack		Slack...								Artificial	Artificial
4	-3	6	-1	0	0	0	0	0	0	0	0	0	0	-100	-100

c proper															
104	97	106	99	-100	-100	0	0	0	0	0	0	0	0	0	0

z_0 = -5500

A

x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}		b	
1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	=	100	≤
0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	=	20	≤
1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	=	40	≤
0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	=	60	≤
1	-10	0	0	0	0	0	0	0	0	1	0	0	0	0	0	=	0	≤
0	0	6	-5	0	0	0	0	0	0	0	1	0	0	0	0	=	0	≤
2	-8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	=	0	≤
0	0	2	-8	0	0	0	0	0	0	0	0	0	1	0	0	=	0	≤
1	1	0	0	-1	0	0	0	0	0	0	0	0	0	1	0	=	50	≥
0	0	1	1	0	-1	0	0	0	0	0	0	0	0	0	1	=	5	≥

Basis 0

(x)		B =	7	8	9	10	11	12	13	14	15	16
	7		1	0	0	0	0	0	0	0	0	0
	8		0	1	0	0	0	0	0	0	0	0
	9		0	0	1	0	0	0	0	0	0	0
	10		0	0	0	1	0	0	0	0	0	0
	11		0	0	0	0	1	0	0	0	0	0
	12		0	0	0	0	0	1	0	0	0	0
	13		0	0	0	0	0	0	1	0	0	0
	14		0	0	0	0	0	0	0	1	0	0
	15		0	0	0	0	0	0	0	0	1	0
	16		0	0	0	0	0	0	0	0	0	1

B^{-1} =

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	1

$x = B^{-1}b$ =

100
20

A =	x_1	x_2	x_3	x_4	x_5	x_6
	1	1	0	0	0	0
	0	0	1	1	0	0

	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}
c_B =	0	0	0	0	0	0	0	0	0	0
$z = c_B x_B$ =	-5500									

40	1	0	**1**	0	0	0
60	0	1	**0**	1	0	0
0	1	-10	**0**	0	0	0
0	0	0	**6**	-5	0	0
0	2	-8	**0**	0	0	0
0	0	0	**2**	-8	0	0
50	1	1	**0**	0	-1	0
5	0	0	**1**	1	0	-1

	x_1	x_2	x_3	x_4	x_5	x_6
$\mathbf{c}_N$ =	104	97	106	99	-100	-100

$\mathbf{B}^{-1}\mathbf{A}$ =

1	1	0	0	0	0
0	0	1	1	0	0
1	0	1	0	0	0
0	1	0	1	0	0
1	-10	0	0	0	0
0	0	6	-5	0	0
2	-8	0	0	0	0
0	0	2	-8	0	0
1	1	0	0	-1	0
0	0	1	1	0	-1

$\mathbf{c}_X = \mathbf{c}_B\,\mathbf{B}^{-1}\mathbf{A}$ =	0	0	0	0	0	0
$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N$ =	-104	-97	**-106**	-99	100	100

Entering, E = 3, x3

δ = -106

θ = 0

$\mathbf{B}^{-1}\mathbf{a}_E$ = / $\mathbf{x}_B / (\mathbf{B}^{-1}\mathbf{a}_E)$ =

0	-1
1	20
1	40
0	-1
0	-1
6	**0**
0	-1
2	0
0	-1
1	5

Leaving, L = 6, x12

next z :

-5500

Basis 1

(x)

$\mathbf{B}$ =

7	***8***	***9***	***10***	***11***	***3***	***13***	***14***	***15***	***16***
7	1	0	0	0	0	**0**	0	0	0	0
8	0	1	0	0	0	**1**	0	0	0	0
9	0	0	1	0	0	**1**	0	0	0	0
10	0	0	0	1	0	**0**	0	0	0	0
11	0	0	0	0	1	**0**	0	0	0	0
3	0	0	0	0	0	**6**	0	0	0	0
13	0	0	0	0	0	**0**	1	0	0	0
14	0	0	0	0	0	**2**	0	1	0	0
15	0	0	0	0	0	**0**	0	0	1	0
16	0	0	0	0	0	**1**	0	0	0	1

$\mathbf{B}^{-1}$ =

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	-0,16667	0	0	0	0

0	0	1	0	0	-0,16667	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,16667	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	-0,33333	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	-0,16667	0	0	0	1

$\mathbf{v} = \mathbf{B}_{old}^{-1}\mathbf{b}_E =$

0
1
1
0
0
6
0
2
0
1

$\mathbf{E} =$

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	-0,16667	0	0	0	0
0	0	1	0	0	-0,16667	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,16667	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	-0,33333	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	-0,16667	0	0	0	1

$\mathbf{B}^{-1} = \mathbf{E}\,\mathbf{B}_{old}^{-1} =$

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	-0,16667	0	0	0	0
0	0	1	0	0	-0,16667	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,16667	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	-0,33333	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	-0,16667	0	0	0	1

Ok

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b} =$

100
20
40
60
0
0
0
50
5

$\mathbf{A} =$

x_1	x_2	x_{12}	x_4	x_5	x_6
1	1	0	**0**	0	0
0	0	0	**1**	0	0
1	0	0	**0**	0	0
0	1	0	**1**	0	0
1	-10	0	**0**	0	0
0	0	1	**-5**	0	0
2	-8	0	**0**	0	0
0	0	0	**-8**	0	0
1	1	0	**0**	-1	0
0	0	0	**1**	0	-1

x_7	x_8	x_9	x_{10}	x_{11}	x_3	x_{13}	x_{14}	x_{15}	x_{16}
0	0	0	0	0	106	0	0	0	0

$\mathbf{c}_B =$

$z = \mathbf{c}_B\,\mathbf{x}_B =$ **-5500**

x_1	x_2	x_{12}	x_4	x_5	x_6
104	97	0	99	-100	-100

$\mathbf{c}_N =$

$\mathbf{B}^{-1}\,\mathbf{A} =$

1	1	0	0	0	0
0	0	-0,16667	1,83333	0	0

$\mathbf{c}_X = \mathbf{c}_B\,\mathbf{B}^{-1}\,\mathbf{A} =$

0	0	17,6667	-88,3333	0	0

$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N =$

-104	-97	17,6667	**-187,333**	100	100

1	0	-0,16667	0,83333	0	0
0	1	0	1	0	0
1	-10	0	0	0	0
0	0	0,16667	-0,83333	0	0
2	-8	0	0	0	0
0	0	-0,33333	-6,33333	0	0
1	1	0	0	-1	0
0	0	-0,16667	1,83333	0	-1

Entering, E = 4, x4

δ = -187,333
θ = 2,72727

$\Delta = \theta\ \delta$ = **510,909**

$\mathbf{B^{-1}a_E}$ = | $\mathbf{x_B / (B^{-1}a_E)}$ =

0	-1
1,83333	10,9091
0,83333	48
1	60
0	-1
-0,83333	**-1**
0	-1
-6,33333	-1
0	-1
1,83333	2,72727

Leaving, L = 10, x16

next z :
-4989,09

Basis | **2**

		7	***8***	***9***	***10***	***11***	***3***	***13***	***14***	***15***	***4***
(x)											
7	**B =**	1	0	0	0	0	0	0	0	0	**0**
8		0	1	0	0	0	1	0	0	0	**1**
9		0	0	1	0	0	1	0	0	0	**0**
10		0	0	0	1	0	0	0	0	0	**1**
11		0	0	0	0	1	0	0	0	0	**0**
3		0	0	0	0	0	6	0	0	0	**-5**
13		0	0	0	0	0	0	1	0	0	**0**
14		0	0	0	0	0	2	0	1	0	**-8**
15		0	0	0	0	0	0	0	0	1	**0**
4		0	0	0	0	0	1	0	0	0	**1**

$\mathbf{B^{-1}}$ =

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	1	0	0	-0,09091	0	0	0	-0,45455
0	0	0	1	0	0,09091	0	0	0	-0,54545
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	-0,09091	0	0	0	0,54545

$\mathbf{v = B_{old}^{-1} b_E}$ =

0
1,83333
0,83333

E =

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	-1
0	0	1	0	0	0	0	0	0	-0,45455

1	0	0	0	1	0	0	0	0	-0,54545
0	0	0	0	0	1	0	0	0	0
-0,83333	0	0	0	0	0	1	0	0	0,45455
0	0	0	0	0	0	0	1	0	0
-6,33333	0	0	0	0	0	0	0	1	3,45455
0	0	0	0	0	0	0	0	0	1
1,83333	0	0	0	0	0	0	0	0	0,54545

$\mathbf{B^{-1} = E\ B_{old}^{-1}}$ =

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	-1
0	0	1	0	0	-0,09091	0	0	0	-0,45455
0	0	0	1	0	0,09091	0	0	0	-0,54545
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	-0,09091	0	0	0	0,54545

Ok

$\mathbf{x = B^{-1}b}$ =

100
15
37,7273
57,2727
0
2,27273
0
17,2727
50
2,72727

A =

x_1	x_2	x_{12}	x_{16}	x_5	x_6
1	1	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
1	-10	0	0	0	0
0	0	1	0	0	0
2	-8	0	0	0	0
0	0	0	0	0	0
1	1	0	0	-1	0
0	0	0	1	0	-1

$\mathbf{c_B}$ =

x_7	x_8	x_9	x_{10}	x_{11}	x_3	x_{13}	x_{14}	x_{15}	x_4
0	0	0	0	0	106	0	0	0	99

$z = \mathbf{c_B\ x_B}$ = **-4989,09**

$\mathbf{c_N}$ =

x_1	x_2	x_{12}	x_{16}	x_5	x_6
104	97	0	0	-100	-100

$\mathbf{B^{-1}\ A}$ =

1	1	0	0	0	0
0	0	1,4E-17	-1	0	1
1	0	-0,09091	-0,45455	0	0,45455
0	1	0,09091	-0,54545	0	0,54545
1	-10	0	0	0	0
0	0	0,09091	0,45455	0	-0,45455
2	-8	0	0	0	0
0	0	-0,90909	3,45455	0	-3,45455
1	1	0	0	-1	0
0	0	-0,09091	0,54545	0	-0,54545

$\mathbf{c_X = c_B\ B^{-1}\ A}$ =

0	0	0,63636	102,182	0	-102,182

$\boldsymbol{\delta} = \mathbf{c_X - c_N}$ =

-104	-97	0,63636	102,182	100	-2,18182

Entering, E = 4, x1

δ = -104

θ = 0

$\Delta = \theta\ \delta$ = **0**

$\mathbf{B^{-1}a_E}$ =

1
0
1

$\mathbf{x_B\ /\ (B^{-1}a_E)}$ =

100
-1
37,7273

0	-1	
1	0	**Leaving**, L = 5, x11
0	**-1**	
2	0	
0	-1	
1	50	
0	-1	

next z :
-4989,09

Basis | **3**

		7	***8***	***9***	***10***	***1***	***3***	***13***	***14***	***15***	***4***
(x)	***7***	**B =**	1	0	0	0	**1**	0	0	0	0	0
	8		0	1	0	0	**0**	1	0	0	0	1
	9		0	0	1	0	**1**	1	0	0	0	0
	10		0	0	0	1	**0**	0	0	0	0	1
	1		0	0	0	0	**1**	0	0	0	0	0
	3		0	0	0	0	**0**	6	0	0	0	-5
	13		0	0	0	0	**2**	0	1	0	0	0
	14		0	0	0	0	**0**	2	0	1	0	-8
	15		0	0	0	0	**1**	0	0	0	1	0
	4		0	0	0	0	**0**	1	0	0	0	1

	B^{-1} =	1	0	0	0	-1	0	0	0	0	0
		0	1	0	0	0	1,4E-17	0	0	0	-1
		0	0	1	0	-1	-0,09091	0	0	0	-0,45455
		0	0	0	1	0	0,09091	0	0	0	-0,54545
		0	0	0	0	1	0	0	0	0	0
		0	0	0	0	0	0,09091	0	0	0	0,45455
		0	0	0	0	-2	0	1	0	0	0
		0	0	0	0	0	-0,90909	0	1	0	3,45455
		0	0	0	0	-1	0	0	0	1	0
		0	0	0	0	0	-0,09091	0	0	0	0,54545

$v = B_{old}^{-1} b_E$ =

1	**E =**	1	0	0	0	-1	0	0	0	0	0
0		0	1	0	0	0	0	0	0	0	0
1		0	0	1	0	-1	0	0	0	0	0
0		0	0	0	1	0	0	0	0	0	0
1		0	0	0	0	**1**	0	0	0	0	0
0		0	0	0	0	0	1	0	0	0	0
2		0	0	0	0	-2	0	1	0	0	0
0		0	0	0	0	0	0	0	1	0	0
1		0	0	0	0	-1	0	0	0	1	0
0		0	0	0	0	0	0	0	0	0	1

$B^{-1} = E\ B_{old}^{-1}$ =	1	0	0	0	-1	0	0	0	0	0	Ok
	0	1	0	0	0	1,4E-17	0	0	0	-1	
	0	0	1	0	-1	-0,09091	0	0	0	-0,45455	
	0	0	0	1	0	0,09091	0	0	0	-0,54545	

0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0	0	-2	0	1	0	0	0
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	0	0	-1	0	0	0	1	0
0	0	0	0	0	-0,09091	0	0	0	0,54545

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b} =$

100
15
37,7273
57,2727
0
2,27273
0
17,2727
50
2,72727

$\mathbf{A} =$

x_{11}	x_2	x_{12}	x_{16}	x_5	x_6
0	**1**	0	0	0	0
0	**0**	0	0	0	0
0	**0**	0	0	0	0
0	**1**	0	0	0	0
1	**-10**	0	0	0	0
0	**0**	1	0	0	0
0	**-8**	0	0	0	0
0	**0**	0	0	0	0
0	**1**	0	0	-1	0
0	**0**	0	1	0	-1

$\mathbf{c}_B =$

x_7	x_8	x_9	x_{10}	x_1	x_3	x_{13}	x_{14}	x_{15}	x_4
0	0	0	0	104	106	0	0	0	99

$z = \mathbf{c}_B \mathbf{x}_B =$ **-4989,09**

$\mathbf{c}_N =$

x_{11}	x_2	x_{12}	x_{16}	x_5	x_6
0	97	0	0	-100	-100

$\mathbf{B}^{-1}\mathbf{A} =$

-1	11	0	0	0	0
0	0	1,4E-17	-1	0	1
-1	10	-0,09091	-0,45455	0	0,45455
0	1	0,09091	-0,54545	0	0,54545
1	-10	0	0	0	0
0	0	0,09091	0,45455	0	-0,45455
-2	12	0	0	0	0
0	0	-0,90909	3,45455	0	-3,45455
-1	11	0	0	-1	0
0	0	-0,09091	0,54545	0	-0,54545

$\mathbf{c}_X = \mathbf{c}_B \mathbf{B}^{-1}\mathbf{A} =$

104	-1040	0,63636	102,182	0	-102,182

$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N =$

104	**-1137**	0,63636	102,182	100	-2,18182

Entering, E = 2, x2

$\delta =$ -1137

$\theta =$ 0

$\Delta = \theta\ \delta =$ **0**

$\mathbf{B}^{-1}\mathbf{a}_E =$

11
0
10
1
-10
0
12
0
11
0

$\mathbf{x}_B / (\mathbf{B}^{-1}\mathbf{a}_E) =$

9,09091
-1
3,77273
57,2727
-1
-1
0
-1
4,54545
-1

Leaving, L = 7, x13

next z :

-4989,09

Basis	4

(x)	
7	
8	
9	

$\mathbf{B} =$

7	***8***	***9***	***10***	***1***	***3***	***2***	***14***	***15***	***4***
1	0	0	0	1	0	**1**	0	0	0
0	1	0	0	0	1	**0**	0	0	1
0	0	1	0	1	1	**0**	0	0	0

10	0	0	0	1	0	0	**1**	0	0	1
1	0	0	0	0	1	0	**-10**	0	0	0
3	0	0	0	0	0	6	**0**	0	0	-5
2	0	0	0	0	2	0	**-8**	0	0	0
14	0	0	0	0	0	2	**0**	1	0	-8
15	0	0	0	0	1	0	**1**	0	1	0
4	0	0	0	0	0	1	**0**	0	0	1

$\mathbf{B}^{-1}$ =

1	0	0	0	0,83333	0	-0,91667	0	0	0
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	1	0	0,66667	-0,09091	-0,83333	0	0	-0,45455
0	0	0	1	0,16667	0,09091	-0,08333	0	0	-0,54545
0	0	0	0	-0,66667	0	0,83333	0	0	0
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0	0	-0,16667	0	0,08333	0	0	0
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	0	0	0,83333	0	-0,91667	0	1	0
0	0	0	0	0	-0,09091	0	0	0	0,54545

$\mathbf{v} = \mathbf{B}_{old}^{-1}\mathbf{b}_E$ =

11
0
10
1
-10
0
12
0
11
0

E =

1	0	0	0	0	0	-0,91667	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	-0,83333	0	0	0
0	0	0	1	0	0	-0,08333	0	0	0
0	0	0	0	1	0	0,83333	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	**0,08333**	0	0	0
0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	-0,91667	0	1	0
0	0	0	0	0	0	0	0	0	1

$\mathbf{B}^{-1} = \mathbf{E}\,\mathbf{B}_{old}^{-1}$ =

1	0	0	0	0,83333	0	-0,91667	0	0	0
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	1	0	0,66667	-0,09091	-0,83333	0	0	-0,45455
0	0	0	1	0,16667	0,09091	-0,08333	0	0	-0,54545
0	0	0	0	-0,66667	0	0,83333	0	0	0
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0	0	-0,16667	0	0,08333	0	0	0
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	0	0	0,83333	0	-0,91667	0	1	0
0	0	0	0	0	-0,09091	0	0	0	0,54545

Ok

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b}$ =

100
15
37,7273

A =

x_{11}	x_{13}	x_{12}	x_{16}	x_5	x_6
0	**0**	0	0	0	0
0	**0**	0	0	0	0
0	**0**	0	0	0	0

	x_7	x_8	x_9	x_{10}	x_1	x_3	x_2	x_{14}	x_{15}	x_4
$\mathbf{c}_B$ =	0	0	0	0	104	106	97	0	0	99

$z = \mathbf{c}_B\,\mathbf{x}_B$ = **-4989,09**

57,2727	0	**0**	0	0	0	0
0	1	**0**	0	0	0	0
2,27273	0	**0**	1	0	0	0
0	0	**1**	0	0	0	0
17,2727	0	**0**	0	0	0	0
50	0	**0**	0	0	-1	0
2,72727	0	**0**	0	1	0	-1

$\mathbf{c_N}$ =

x_{11}	x_{13}	x_{12}	x_{16}	x_5	x_6
0	0	0	0	-100	-100

$\mathbf{B^{-1}\,A}$ =

0,83333	-0,91667	0	0	0	0
0	0	1,4E-17	-1	0	1
0,66667	-0,83333	-0,09091	-0,45455	0	0,45455
0,16667	-0,08333	0,09091	-0,54545	0	0,54545
-0,66667	0,83333	0	0	0	0
0	0	0,09091	0,45455	0	-0,45455
-0,16667	0,08333	0	0	0	0
0	0	-0,90909	3,45455	0	-3,45455
0,83333	-0,91667	0	0	-1	0
0	0	-0,09091	0,54545	0	-0,54545

$\mathbf{c_X = c_B\,B^{-1}\,A}$ =

-85,5	94,75	0,63636	102,182	0	-102,182

$\mathbf{\delta = c_X - c_N}$ =

-85,5	94,75	0,63636	102,182	100	-2,18182

Entering, E = 1, x11

δ = -85,5

θ = 56,5909

$\Delta = \theta\ \delta$ = **4838,52**

$\mathbf{B^{-1}a_E}$ =

0,83333
0
0,66667
0,16667
-0,66667
0
-0,16667
0
0,83333
0

$\mathbf{x_B / (B^{-1}a_E)}$ =

120
-1
56,5909
343,636
-1
-1
-1
-1
60
-1

Leaving, L = 3, x9

next z :

-150,568

Basis | **5**

		7	***8***	***11***	***10***	***1***	***3***	***2***	***14***	***15***	***4***
(x)	***7***	**B** =	1	0	**0**	0	1	0	1	0	0	0
	8		0	1	**0**	0	0	1	0	0	0	1
	11		0	0	**0**	0	1	1	0	0	0	0
	10		0	0	**0**	1	0	0	1	0	0	1
	1		0	0	**1**	0	1	0	-10	0	0	0
	3		0	0	**0**	0	0	6	0	0	0	-5
	2		0	0	**0**	0	2	0	-8	0	0	0
	14		0	0	**0**	0	0	2	0	1	0	-8
	15		0	0	**0**	0	1	0	1	0	1	0
	4		0	0	**0**	0	0	1	0	0	0	1

$\mathbf{B^{-1}}$ =

1	0	-1,25	0	0	0,11364	0,125	0	0	0,56818
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	1,5	0	1	-0,13636	-1,25	0	0	-0,68182

0	0	-0,25	1	0	0,11364	0,125	0	0	-0,43182
0	0	1	0	0	-0,09091	0	0	0	-0,45455
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0,25	0	0	-0,02273	-0,125	0	0	-0,11364
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	-1,25	0	0	0,11364	0,125	0	1	0,56818
0	0	0	0	0	-0,09091	0	0	0	0,54545

$\mathbf{v} = \mathbf{B}_{old}^{-1}\mathbf{b}_E =$

0,83333
0
0,66667
0,16667
-0,66667
0
-0,16667
0
0,83333
0

$\mathbf{E} =$

1	0	-1,25	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	**1,5**	0	0	0	0	0	0	0
0	0	-0,25	1	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0,25	0	0	0	1	0	0	0
0	0	0	0	0	0	0	1	0	0
0	0	-1,25	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	1

$\mathbf{B}^{-1} = \mathbf{E}\,\mathbf{B}_{old}^{-1} =$

1	0	-1,25	0	0	0,11364	0,125	0	0	0,56818
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	1,5	0	1	-0,13636	-1,25	0	0	-0,68182
0	0	-0,25	1	0	0,11364	0,125	0	0	-0,43182
0	0	1	0	0	-0,09091	0	0	0	-0,45455
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	0,25	0	0	-0,02273	-0,125	0	0	-0,11364
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	-1,25	0	-1,1E-16	0,11364	0,125	0	1	0,56818
0	0	0	0	0	-0,09091	0	0	0	0,54545

Ok

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b} =$

52,8409
15
56,5909
47,8409
37,7273
2,27273
9,43182
17,2727
2,84091
2,72727

$\mathbf{A} =$

x_9	x_{13}	x_{12}	x_{16}	x_5	x_6
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	0	0	0	0	0
0	0	0	0	-1	0
0	0	0	1	0	-1

$\mathbf{c}_B =$

x_7	x_8	x_{11}	x_{10}	x_1	x_3	x_2	x_{14}	x_{15}	x_4
0	0	0	0	104	106	97	0	0	99

$z = \mathbf{c}_B\,\mathbf{x}_B =$ **-150,568**

$\mathbf{c}_N =$

x_9	x_{13}	x_{12}	x_{16}	x_5	x_6
0	0	0	0	-100	-100

$\mathbf{B}^{-1}\,\mathbf{A} =$

-1,25	0,125	0,11364	0,56818	0	-0,56818
0	0	1,4E-17	-1	0	1
1,5	-1,25	-0,13636	-0,68182	0	0,68182

$\mathbf{c}_X = \mathbf{c}_B\,\mathbf{B}^{-1}\,\mathbf{A} =$

128,25	-12,125	-11,0227	43,8864	0	-43,8864

$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N =$

128,25	**-12,125**	-11,0227	43,8864	100	56,1136

Entering, E = 2, x13

-0,25	0,125	0,11364	-0,43182	0	0,43182
1	0	-0,09091	-0,45455	0	0,45455
0	0	0,09091	0,45455	0	-0,45455
0,25	-0,125	-0,02273	-0,11364	0	0,11364
0	0	-0,90909	3,45455	0	-3,45455
-1,25	0,125	0,11364	0,56818	-1	-0,56818
0	0	-0,09091	0,54545	0	-0,54545

δ = -12,125

θ = 22,7273

$\Delta = \theta\ \delta$ = **275,568**

$\mathbf{B}^{-1}\mathbf{a}_E$ = 0,125 / 0 / -1,25 / 0,125 / 0 / 0 / -0,125 / 0 / 0,125 / 0

$\mathbf{x}_B / (\mathbf{B}^{-1}\mathbf{a}_E)$ = 422,727 / -1 / -1 / 382,727 / -1 / **-1** / -1 / -1 / 22,7273 / -1

Leaving, L = 9, x15

next z : **125**

Basis **6**

(x)		7	8	11	10	1	3	2	14	13	4
	7	$\mathbf{B}$ = 1	0	0	0	1	0	1	0	**0**	0
	8	0	1	0	0	0	1	0	0	**0**	1
	11	0	0	0	0	1	1	0	0	**0**	0
	10	0	0	0	1	0	0	1	0	**0**	1
	1	0	0	1	0	1	0	-10	0	**0**	0
	3	0	0	0	0	0	6	0	0	**0**	-5
	2	0	0	0	0	2	0	-8	0	**1**	0
	14	0	0	0	0	0	2	0	1	**0**	-8
	13	0	0	0	0	1	0	1	0	**0**	0
	4	0	0	0	0	0	1	0	0	**0**	1

$\mathbf{B}^{-1}$ =

1	0	2,2E-16	0	0	2,8E-17	0	0	-1	-1,1E-16
0	1	0	0	0	1,4E-17	0	0	0	-1
0	0	-11	0	1	1	0	0	10	5
0	0	1	1	0	0	0	0	-1	-1
0	0	1	0	0	-0,09091	0	0	0	-0,45455
0	0	0	0	0	0,09091	0	0	0	0,45455
0	0	-1	0	0	0,09091	0	0	1	0,45455
0	0	0	0	0	-0,90909	0	1	0	3,45455
0	0	-10	0	0	0,90909	1	0	8	4,54545
0	0	0	0	0	-0,09091	0	0	0	0,54545

$\mathbf{v} = \mathbf{B}_{old}^{-1}\mathbf{b}_E$ =

0,125 / 0 / -1,25 / 0,125

$\mathbf{E}$ =

1	0	0	0	0	0	0	0	-1	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	10	0
0	0	0	1	0	0	0	0	-1	0

0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0
-0,125	0	0	0	0	0	0	1	0	1	0
0	0	0	0	0	0	0	0	1	0	0
0,125	0	0	0	0	0	0	0	0	**8**	0
0	0	0	0	0	0	0	0	0	0	1

$\mathbf{B}^{-1} = \mathbf{E}\,\mathbf{B}_{old}^{-1} =$

1	0	2,2E-16	0	0	-2,8E-17	0	0	-1	-1,1E-16	Ok
0	1	0	0	0	1,4E-17	0	0	0	-1	
0	0	-11	0	1	1	0	0	10	5	
0	0	1	1	0	-1,4E-17	0	0	-1	-1	
0	0	1	0	0	-0,09091	0	0	0	-0,45455	
0	0	0	0	0	0,09091	0	0	0	0,45455	
0	0	-1	0	0	0,09091	0	0	1	0,45455	
0	0	0	0	0	-0,90909	0	1	0	3,45455	
0	0	-10	0	0	0,90909	1	0	8	4,54545	
0	0	0	0	0	-0,09091	0	0	0	0,54545	

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b} =$

	x_9	x_{15}	x_{12}	x_{16}	x_5	x_6
50	0	**0**	0	0	0	0
15	0	**0**	0	0	0	0
85	1	**0**	0	0	0	0
45	0	**0**	0	0	0	0
37,7273	0	**0**	0	0	0	0
2,27273	0	**0**	1	0	0	0
12,2727	0	**0**	0	0	0	0
17,2727	0	**0**	0	0	0	0
22,7273	0	**1**	0	0	-1	0
2,72727	0	**0**	0	1	0	-1

$\mathbf{A} =$

x_7	x_8	x_{11}	x_{10}	x_1	x_3	x_2	x_{14}	x_{13}	x_4
0	0	0	0	104	106	97	0	0	99

$\mathbf{c}_B =$

$z = \mathbf{c}_B\,\mathbf{x}_B =$ **125**

x_9	x_{15}	x_{12}	x_{16}	x_5	x_6
0	0	0	0	-100	-100

$\mathbf{c}_N =$

$\mathbf{B}^{-1}\,\mathbf{A} =$

2,2E-16	-1	2,8E-17	-1,1E-16	1	1,1E-16
0	0	1,4E-17	-1	0	1
-11	10	1	5	-10	-5
1	-1	0	-1	1	1
1	0	-0,09091	-0,45455	0	0,45455
0	0	0,09091	0,45455	0	-0,45455
-1	1	0,09091	0,45455	-1	-0,45455
0	0	-0,90909	3,45455	0	-3,45455
-10	8	0,90909	4,54545	-8	-4,54545
0	0	-0,09091	0,54545	0	-0,54545

$\mathbf{c}_X = \mathbf{c}_B\,\mathbf{B}^{-1}\,\mathbf{A} =$	7	97	-3,6E-15	99	-97	-99
$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N =$	7	97	**-3,6E-15**	99	3	1

OPTIMUM **Entering**, E = 3, x12

$\delta =$ -3,6E-15 i.e., zero

$\theta =$ 2,84091 $\Delta = \theta\,\delta =$ **1E-14**

Continue to find multiple

$\mathbf{B}^{-1}\mathbf{a}_E =$

-1
0
10
-1

$\mathbf{x}_B / (\mathbf{B}^{-1}\mathbf{a}_E) =$

-50
-1
8,5
-45

0	-1		
0	**-1**		
1	12,2727		
0	-1		
8	2,84091	**Leaving**, L = 9, x13	next z :
0	-1		**125**

Basis 7

(x)	B =	**7**	**8**	**11**	**10**	**1**	**3**	**2**	**14**	**12**	**4**
7		1	0	0	0	1	0	1	0	**0**	0
8		0	1	0	0	0	1	0	0	**0**	1
11		0	0	0	0	1	1	0	0	**0**	0
10		0	0	0	1	0	0	1	0	**0**	1
1		0	0	1	0	1	0	-10	0	**0**	0
3		0	0	0	0	0	6	0	0	**1**	-5
2		0	0	0	0	2	0	-8	0	**0**	0
14		0	0	0	0	0	2	0	1	**0**	-8
12		0	0	0	0	1	0	1	0	**0**	0
4		0	0	0	0	0	1	0	0	**0**	1

$\mathbf{B}^{-1}$ =

1	0	0	0	0	0	2,8E-17	0	-1	0
0	1	0	0	0	0	1,4E-17	0	1,1E-16	-1
0	0	0	0	1	0	-1,1	0	1,2	0
0	0	1	1	0	0	2,8E-17	0	-1	-1
0	0	0	0	0	0	0,1	0	0,8	0
0	0	1	0	0	0	-0,1	0	-0,8	0
0	0	0	0	0	0	-0,1	0	0,2	0
0	0	-10	0	0	0	1	1	8	8
0	0	-11	0	0	1	1,1	0	8,8	5
0	0	-1	0	0	0	0,1	0	0,8	1

$\mathbf{v} = \mathbf{B}_{old}^{-1}\mathbf{b}_E$ = | E =

v	E =										
2,8E-17		1	0	0	0	0	0	0	0	-3,1E-17	0
1,4E-17		0	1	0	0	0	0	0	0	-1,5E-17	0
1		0	0	1	0	0	0	0	0	-1,1	0
0		0	0	0	1	0	0	0	0	0	0
-0,09091		0	0	0	0	1	0	0	0	0,1	0
0,09091		0	0	0	0	0	1	0	0	-0,1	0
0,09091		0	0	0	0	0	0	1	0	-0,1	0
-0,90909		0	0	0	0	0	0	0	1	1	0
0,90909		0	0	0	0	0	0	0	0	**1,1**	0
-0,09091		0	0	0	0	0	0	0	0	0,1	1

$\mathbf{B}^{-1} = \mathbf{E}\,\mathbf{B}_{old}^{-1}$ =

1	0	5,3E-16	0	0	0	-3,1E-17	0	-1	-2,5E-16	Ok
0	1	1,5E-16	0	0	0	-1,5E-17	0	-1,2E-16	-1	
0	0	-1,8E-15	0	1	0	-1,1	0	1,2	8,9E-16	
0	0	1	1	0	0	0	0	-1	-1	
0	0	-4,4E-16	0	0	0	0,1	0	0,8	1,7E-16	

0	0	1	0	0	0	-0,1	0	-0,8	0
0	0	-2,2E-16	0	0	0	-0,1	0	0,2	5,6E-17
0	0	-10	0	0	0	1	1	8	8
0	0	-11	0	0	1	1,1	0	8,8	5
0	0	-1	0	0	0	0,1	0	0,8	1

$\mathbf{x} = \mathbf{B}^{-1}\mathbf{b} =$

50
15
60
45
40
-7,1E-15
10
40
25
5

$\mathbf{A} =$

x_9	x_{15}	x_{13}	x_{16}	x_5	x_6
0	0	**0**	0	0	0
0	0	**0**	0	0	0
1	0	**0**	0	0	0
0	0	**0**	0	0	0
0	0	**0**	0	0	0
0	0	**1**	0	0	0
0	0	**0**	0	0	0
0	0	**0**	0	0	0
0	1	**0**	0	-1	0
0	0	**0**	1	0	-1

$\mathbf{c}_B =$

x_7	x_8	x_{11}	x_{10}	x_1	x_3	x_2	x_{14}	x_{12}	x_4
0	0	0	0	104	106	97	0	0	99

$z = \mathbf{c}_B \mathbf{x}_B =$ **125**

$\mathbf{c}_N =$

x_9	x_{15}	x_{13}	x_{16}	x_5	x_6
0	0	0	0	-100	-100

$\mathbf{B}^{-1}\mathbf{A} =$

0	-1	0	0	1	0
0	1,1E-16	0	-1	-1,1E-16	1
0	1,2	0	0	-1,2	0
1	-1	0	-1	1	1
0	0,8	0	0	-0,8	0
1	-0,8	0	0	0,8	0
0	0,2	0	0	-0,2	0
-10	8	0	8	-8	-8
-11	8,8	1	5	-8,8	-5
-1	0,8	0	1	-0,8	-1

$\mathbf{c}_X = \mathbf{c}_B \mathbf{B}^{-1} \mathbf{A} =$

7	97	0	99	-97	-99

$\boldsymbol{\delta} = \mathbf{c}_X - \mathbf{c}_N =$

7	97	**0**	99	3	1

OPTIMUM **Entering**, E = 3, x13

$\delta =$ 0 i.e., zero Continue to find multiple

$\theta =$ 25 $\Delta = \theta\ \delta =$ **0**

$\mathbf{B}^{-1}\mathbf{a}_E =$

0
0
0
0
0
0
0
0
1
0

$\mathbf{x}_B / (\mathbf{B}^{-1}\mathbf{a}_E) =$

-1
-1
-1
-1
-1
-1
-1
-1
25
-1

Leaving, L = 9, x12

next z :

125

$\mathbf{c} =$	4	-3	6	-1
$\mathbf{x}_1 =$	37,7273	12,2727	2,27273	2,72727
$\mathbf{x}_2 =$	40	10	-7,1E-15	5

$z_1 =$ 125

$z_2 =$ 125

Sends back. Done. There are two solutions.