

Программа SIMP.EXE

Исследование операций
с применением компьютера
Версия 2.00a (2007)

PRIMAL SIMPLEX METHOD
Reading problem from a file

SIMP /2

Type of problem : MAXIMIZATION MINIMIZATION

Number of variables (max.20) 3 Number of the constraints (max.20) 3

1.00 1.00 1.00

x(1) x(2) x(3)

1	1.00	2.00	1.00	≤	16.00
2	2.00	1.00	1.00	≥	4.00
3	1.00	1.00	2.00	=	5.00

Converting problem to basic form

Max	+	+	+		
x	1	2	3		
	1	+	1	≤	+
	+	1	1	≥	+
	1	1	+	=	+

Is the problem in basic form ? Yes No

Converting problem to basic form

Max	+	+	+		
x	1	2	3		
→	1	+	1	≤	+
→	+	1	1	≥	+
→	1	1	+	=	+

Select the constraint

Converting problem to basic form

Max	+	+	+		
x	1	2	3		
→	1	+	1	≤	+
	+	1	1	≥	+
	1	1	+	=	+

How will you convert the constraint ?

- 1. Add slack variable
- 2. Add surplus variable
- 3. Add artificial variable
- 4. Exit

Converting problem to basic form

Max	+	+	+	0	0	-M	-M		
x	1	2	3	4	5	6	7		
	1	+	1	1	0	0	0	=	+
	+	1	1	0	-	1	0	=	+
	1	1	+	0	0	0	1	=	+

Do you want to enter value of M ?

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP /7

Iteration 1

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	1.00	2.00	1.00	1.00	0.00	0.00	0.00	16.00
x(6)	-100.00	2.00	1.00	1.00	0.00	-1.00	1.00	0.00	4.00
x(7)	-100.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
c(i)-z(i)		301.00	201.00	301.00	0.00	-100.00	0.00	0.00	

Value of the objective function =

-900.0000000000

Is the solution optimal ? Yes No

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP /8

Iteration 1

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	1.00	2.00	1.00	1.00	0.00	0.00	0.00	16.00
x(6)	-100.00	2.00	1.00	1.00	0.00	-1.00	1.00	0.00	4.00
x(7)	-100.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
c(i)-z(i)		301.00	201.00	301.00	0.00	-100.00	0.00	0.00	

Value of the optimality coefficient =

301.0000000000

Value of the objective function =

-900.0000000000

Select the variable entering the basis

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP /9

Iteration 1

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	1.00	2.00	1.00	1.00	0.00	0.00	0.00	16.00
x(6)	-100.00	2.00	1.00	1.00	0.00	-1.00	1.00	0.00	4.00
x(7)	-100.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
c(i)-z(i)		301.00	201.00	301.00	0.00	-100.00	0.00	0.00	

Value of the objective function = -900.0000000000

Does the selected variable indicate unbounded objective function ? Yes No

Iteration 1

Basis	Vector of const.	Coefficients for variable $x(1)$	Vector of ratios
$x(4)$	16.0000	1.0000	16.00000000
$x(6)$	4.0000	2.0000	2.00000000
$x(7)$	5.0000	1.0000	5.00000000

Coefficient =

2.0000000000

Select the variable leaving the basis

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP/11

Optimal solution

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	-1.00	0.00	-3.00	1.00	0.00	0.00	-2.00	6.00
x(2)	1.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
x(5)	0.00	-1.00	0.00	1.00	0.00	1.00	-1.00	1.00	1.00
c(i)-z(i)		0.00	0.00	-1.00	0.00	0.00	-100.00	-101.00	

Value of the objective function =

5.0000000000

Is the initial problem infeasible ? Yes No

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP/12

Optimal solution

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	-1.00	0.00	-3.00	1.00	0.00	0.00	-2.00	6.00
x(2)	1.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
x(5)	0.00	-1.00	0.00	1.00	0.00	1.00	-1.00	1.00	1.00
c(i)-z(i)		0.00	0.00	-1.00	0.00	0.00	-100.00	-101.00	

Value of the objective function =

5.0000000000

1. Alternative solution
2. Exact solution
3. Sensitivity analysis
4. Exit

Optimal solution

Variable	Value	Optimality coefficient	Decision variable	Basic variable
x(1)	0.00	0.00	Yes	No
x(2)	5.00	0.00	Yes	Yes
x(3)	0.00	-1.00	Yes	No
x(4)	6.00	0.00	No	Yes
x(5)	1.00	0.00	No	Yes
x(6)	0.00	-100.00	No	No
x(7)	0.00	-101.00	No	No

Value of the objective function =

5.00

PRIMAL SIMPLEX METHOD
Solving the problem

SIMP/14

Generating alternative solution

cx → max		1.00	1.00	1.00	0.00	0.00	-100.00	-100.00	Vector of const.
Basis	c(B)	x(1)	x(2)	x(3)	x(4)	x(5)	x(6)	x(7)	
x(4)	0.00	-1.00	0.00	-3.00	1.00	0.00	0.00	-2.00	6.00
x(2)	1.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	5.00
x(5)	0.00	-1.00	0.00	1.00	0.00	1.00	-1.00	1.00	1.00
c(i)-z(i)		0.00	0.00	-1.00	0.00	0.00	-100.00	-101.00	

Value of the optimality coefficient =

0.0000000000

Value of the objective function =

5.0000000000

Select the variable entering the basis

Generating alternative solution

Basis	Vector of const.	Coefficients for variable $x(1)$	Vector of ratios
$x(4)$	6.0000	-1.0000	6.000000000
$x(2)$	5.0000	1.0000	5.000000000
$x(5)$	1.0000	-1.0000	1.000000000

Coefficient =

5.0000000000

Select the variable leaving the basis

Sensitivity analysis

Coef- ficient	Lower bound	Value in problem	Upper bound
c(1)	1.00000	1.00000	none
c(2)	none	1.00000	1.00000
c(3)	none	1.00000	2.00000
b(1)	5.00000	16.00000	none
b(2)	0.00000	4.00000	10.00000
b(3)	2.00000	5.00000	16.00000