**Problem: hw5\_1**

**#Model**

set T = 1..35;

param x1 {T};

param x2 {T};

param y {T};

param c;

var w1;

var w2;

var beta;

var yip {T} >= 0;

var k {T};

#option solver cplex;

#Objective function

minimize cost: 0.5 \* w1 \* w1 + 0.5 \* w2 \* w2 + c \* ( sum {i in T} yip [i] );

Con {i in T}: y [i] \* ( w1 \* x1 [i] + w2 \* x2 [i] + beta ) >= 1 - yip [i];

conk {i in T}: k [i] = y[i] \* ( w1 \* x1 [i] + w2 \* x2 [i] + beta );

**#Data**

param c = 10000;

param y := 1 1 2 -1 3 -1 4 1 5 1 6 1 7 1 8 -1 9 -1 10 -1 11 -1 12 -1 13 1 14 1 15 1 16 1 17 1 18 1 19 -1

20 1 21 1 22 1 23 -1 24 -1 25 1 26 -1 27 1 28 1 29 1 30 1 31 -1 32 -1 33 -1 34 1 35 1;

param x1 := 1 -0.0192 2 -0.0302 3 -0.1170 4 0.4454 5 -0.7989 6 0.0935 7 0.2654 8 0.604 9 -0.6324 10

0.977 11 0.926 12 0.8055 13 0.3007 14 -0.2771 15 0.3782 16 -0.5911 17 -0.2501 18 -0.1130 19 0.9353 20 -

0.1272 21 -0.0244 22 0.2476 23 0.1555 24 -0.9507 25 -0.6986 26 -0.4293 27 -0.8917 28 0.1545 29 -0.8230

30 -0.5885 31 -0.6578 32 -0.2009 33 0.0965 34 0.3399 35 -0.0519;

param x2 := 1 0.4565 2 -0.8531 3 -0.9854 4 0.3952 5 -0.2569 6 0.7398 7 0.3098 8 -0.0959 9 -0.9139 10 -

0.4862 11 0.0075 12 -0.0103 13 0.9564 14 0.1357 15 0.68 16 -0.1808 17 0.4231 18 0.8032 19 -0.2590 20

0.9856 21 0.778 22 0.7701 23 -0.8341 24 -1.0000 25 -0.0473 26 -0.9466 27 0.2226 28 0.4526 29 0.7856 30

0.5231 31 -0.7660 32 -0.7598 33 -0.8755 34 0.8383 35 0.9419;

**#OUTPUT: c = 10000**

ampl: #RESET

reset;

#LOAD THE MODEL

model D:\Users\Administrator\Desktop\eg\hw5\_1\_1.mod;

#Input Data

data D:\Users\Administrator\Desktop\eg\hw5\_1\_1.dat;

#Solver Change

option solver cplex;

option presolve 0;

solve;

CPLEX 12.6.1.0: optimal solution; objective 8.483095237

12 separable QP barrier iterations

No basis.

ampl: display w1;

w1 = -1.93193

ampl: display w2;

w2 = 3.63783

ampl: display beta;

beta = 0.515755

ampl: display yip;

yip [\*] :=

1 3.79649e-14 10 3.79649e-14 19 3.79649e-14 28 3.79649e-14

2 3.79649e-14 11 3.79649e-14 20 3.79649e-14 29 3.79649e-14

3 3.79649e-14 12 3.79649e-14 21 3.79649e-14 30 3.79649e-14

4 3.79649e-14 13 3.79649e-14 22 3.79649e-14 31 3.79897e-14

5 3.79649e-14 14 3.79649e-14 23 3.79649e-14 32 3.79649e-14

6 3.79649e-14 15 3.79649e-14 24 3.79649e-14 33 3.79649e-14

7 3.79649e-14 16 3.79972e-14 25 3.79649e-14 34 3.79649e-14

8 3.79725e-14 17 3.79649e-14 26 3.79649e-14 35 3.79649e-14

9 3.79649e-14 18 3.79649e-14 27 3.79649e-14

;

ampl: display k;

k [\*] :=

1 2.21352 7 1.13002 13 3.41405 19 2.23338 25 1.69333 31 1

2 2.52934 8 1 14 1.54475 20 4.34695 26 2.09844 32 1.86015

3 2.84293 9 1.58711 15 2.25882 21 3.39313 27 3.04824 33 2.8556

4 1.09294 10 3.14046 16 1 22 2.8389 28 1.86375 34 2.90869

5 1.12462 11 1.24593 17 2.5381 23 2.81898 29 4.96362 35 4.0425

6 3.02639 12 1.07789 18 3.65597 24 1.28539 30 3.55565

;

**#OUTPUT: c = 100**

CPLEX 12.6.1.0: optimal solution; objective 8.483095272

11 separable QP barrier iterations

No basis.

ampl: display w1;

w1 = -1.93193

ampl: display w2;

w2 = 3.63783

ampl: display beta;

beta = 0.515755

ampl: display yip;

yip [\*] :=

1 1.30831e-11 10 1.30831e-11 19 1.30831e-11 28 1.30831e-11

2 1.30831e-11 11 1.30831e-11 20 1.30831e-11 29 1.30831e-11

3 1.30831e-11 12 1.30831e-11 21 1.30831e-11 30 1.30831e-11

4 1.30831e-11 13 1.30831e-11 22 1.30831e-11 31 1.39932e-11

5 1.30831e-11 14 1.30831e-11 23 1.30831e-11 32 1.30831e-11

6 1.30831e-11 15 1.30831e-11 24 1.30831e-11 33 1.30831e-11

7 1.30831e-11 16 1.42959e-11 25 1.30831e-11 34 1.30831e-11

8 1.33473e-11 17 1.30831e-11 26 1.30831e-11 35 1.30831e-11

9 1.30831e-11 18 1.30831e-11 27 1.30831e-11

;

ampl: display k;

k [\*] :=

1 2.21352 7 1.13002 13 3.41405 19 2.23338 25 1.69333 31 1

2 2.52934 8 1 14 1.54475 20 4.34695 26 2.09844 32 1.86015

3 2.84293 9 1.58711 15 2.25882 21 3.39313 27 3.04824 33 2.8556

4 1.09294 10 3.14046 16 1 22 2.8389 28 1.86375 34 2.90869

5 1.12462 11 1.24593 17 2.5381 23 2.81898 29 4.96362 35 4.0425

6 3.02639 12 1.07789 18 3.65597 24 1.28539 30 3.55565

;

**#OUTPUT: c = 1**

CPLEX 12.6.1.0: optimal solution; objective 6.056335782

11 separable QP barrier iterations

No basis.

ampl: display w1;

w1 = -1.40852

ampl: display w2;

w2 = 2.38229

ampl: display beta;

beta = 0.286423

ampl: display yip;

yip [\*] :=

1 3.40035e-11 10 3.40035e-11 19 3.40035e-11 28 3.40035e-11

2 3.40035e-11 11 1.79605e-10 20 3.40035e-11 29 3.40035e-11

3 3.40035e-11 12 0.127322 21 3.40035e-11 30 3.40035e-11

4 0.399453 13 3.40035e-11 22 3.40035e-11 31 0.388117

5 0.200319 14 5.96255e-10 23 3.40035e-11 32 3.40035e-11

6 3.40035e-11 15 3.40035e-11 24 0.243217 33 3.40035e-11

7 0.349366 16 0.311718 25 3.40035e-11 34 3.40035e-11

8 0.207215 17 3.40035e-11 26 3.40035e-11 35 3.40035e-11

9 3.91878e-11 18 3.40035e-11 27 3.40035e-11

;

ampl: display k;

k [\*] :=

1 1.40098 8 0.792785 15 1.37367 22 1.77227 29 3.31716

2 1.70337 9 1 16 0.688282 23 1.91967 30 2.36151

3 1.89628 10 2.24797 17 1.64664 24 0.756783 31 0.611883

4 0.600547 11 1 18 2.35904 25 1.15773 32 1.24067

5 0.799681 12 0.872678 19 1.64798 26 1.36397 33 1.93519

6 1.91714 13 2.1413 20 2.81357 27 2.0727 34 1.80474

7 0.650634 14 1 21 2.17421 28 1.14703 35 2.6034

;

**Problem: hw5\_4\_4**

**#Model**

var x >= 0;

var y1 >= 0;

var y2 >= 0;

var y3 >= 0;

maximize v: - 120 \* x + 0.25 \* (250 \* 450 - y1 \*550) + 0.55 \* (250 \* 900 - y2 \*550) + 0.20 \* (250 \* 1250 - y3 \*550)

con3: x + y3 >= 1250;

con2: x + y2 >= 900;

con1: x + y1 >= 450;

**#OUTPUT**

ampl: #RESET

reset;

#LOAD THE MODEL

model D:\Users\Administrator\Desktop\eg\hw5\_4\_4.mod;

#Solver Change

option solver cplex;

option presolve 0;

solve;

CPLEX 12.6.1.0: optimal solution; objective 67875

0 dual simplex iterations (0 in phase I)

ampl: display x;

x = 900

ampl: display y1;

y1 = 0

ampl: display y2;

y2 = 0

ampl: display y3;

y3 = 350