```
"E:\1 □□□□\3 □□□□□\1 □□□□□□\1 □□□□□□□□\1_□□□□□□_□□□□\1_LW _□□□□\4 □□□□\3 python_code\1 exzample\2 □□□□□□\9 Code for this paper\Scripts\python.exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=33758

import sys; print('Python %s on %s' % (sys.version, sys.platform))
sys.path.extend(['E:\\1 □□□□\\3 □□□□□\\1 □□□□□□\\1 □□□□□□□□\\1_□□□□□□_□□□□\\1_LW _□□□□\\4 □□□□\\3 python_code\\9 Code for this paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper'])

PyDev console: starting.

Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
>>> runfile('E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper/main_RO_CCG.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper')
Backend TkAgg is interactive backend. Turning interactive mode on.
Waiting 5s.....
Set parameter MIPGap to value 1e-10
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 481534 rows, 46641 columns and 1344872 nonzeros
Model fingerprint: 0x3e7421da
Variable types: 1 continuous, 46640 integer (46608 binary)
Coefficient statistics:
  Matrix range     [1e+00, 1e+10]
  Objective range  [1e+00, 2e+01]
  Bounds range     [1e+00, 1e+00]
  RHS range        [1e+00, 2e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 262377 rows and 19927 columns (presolve time = 5s) ...
Presolve removed 424133 rows and 30617 columns
Presolve time: 8.40s
Presolved: 57401 rows, 16024 columns, 231304 nonzeros
Variable types: 0 continuous, 16024 integer (16000 binary)

Deterministic concurrent LP optimizer: primal and dual simplex (primal and dual model)
Showing first log only...

Root relaxation presolved: 57396 rows, 16029 columns, 231289 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    8.4300000e+02   7.187500e+01   1.524365e+08      9s
Concurrent spin time: 0.02s

Solved with dual simplex (primal model)

Root relaxation: objective 8.430000e+02, 2419 iterations, 0.32 seconds (0.31 work units)

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

     0     0  843.00000    0   22          -  843.00000      -     -    9s
H    0     0                3883.0000000  843.00000  78.3%     -    9s
H    0     0                2023.0000000  843.00000  58.3%     -   10s
     0     0  843.00000    0  148 2023.00000  843.00000  58.3%     -   10s
H    0     0                1963.0000000  843.00000  57.1%     -   10s
     0     0  843.00000    0  148 1963.00000  843.00000  57.1%     -   10s
     0     0  843.00000    0   86 1963.00000  843.00000  57.1%     -   12s
     0     0  843.00000    0   80 1963.00000  843.00000  57.1%     -   12s
H    0     0                1323.0000000  843.00000  36.3%     -   12s
     0     0  843.00000    0   14 1323.00000  843.00000  36.3%     -   14s
     0     0  843.00000    0   19 1323.00000  843.00000  36.3%     -   14s
H    0     0                 883.0000000  843.00000  4.53%     -   14s
     0     0  843.00000    0   87  883.00000  843.00000  4.53%     -   15s
     0     0  843.00000    0   99  883.00000  843.00000  4.53%     -   15s
     0     0  843.00000    0   25  883.00000  843.00000  4.53%     -   19s
     0     0  843.00000    0  211  883.00000  843.00000  4.53%     -   20s
     0     0  843.00000    0  279  883.00000  843.00000  4.53%     -   20s
H    0     0                 843.0000000  843.00000  0.00%     -   20s

Cutting planes:
  Gomory: 9
  Lift-and-project: 2
  Cover: 46
  Implied bound: 3
  Clique: 21
```

```
  MIR: 28
  StrongCG: 18
  GUB cover: 10
  Zero half: 2
  RLT: 17
  Relax-and-lift: 54
  BQP: 3

Explored 1 nodes (30905 simplex iterations) in 21.37 seconds (36.73 work units)
Thread count was 8 (of 8 available processors)

Solution count 6: 843 883 1323 ... 3883

Optimal solution found (tolerance 1.00e-10)
Best objective 8.430000000000e+02, best bound 8.430000000000e+02, gap 0.0000%
Set parameter MIPGap to value 1e-08
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 1983204 rows, 1559473 columns and 13693357 nonzeros
Model fingerprint: 0xd0c8d0c8
Variable types: 766961 continuous, 792512 integer (787112 binary)
Coefficient statistics:
  Matrix range     [1e-01, 1e+10]
  Objective range  [6e-05, 5e+01]
  Bounds range     [1e+00, 8e+01]
  RHS range        [8e-01, 1e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 1978251 rows and 1557811 columns
Presolve time: 4.13s
Presolved: 4953 rows, 1662 columns, 13084 nonzeros
Variable types: 6 continuous, 1656 integer (953 binary)
Found heuristic solution: objective 3879.1111111
Found heuristic solution: objective 3899.1111111

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    1.1382000e+04   5.068677e+03   0.000000e+00      5s
    1590    5.6051111e+03   0.000000e+00   0.000000e+00      5s

Root relaxation: objective 5.605111e+03, 1590 iterations, 0.02 seconds (0.02 work units)

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

H    0     0                    5605.1111111 15291.7778   173%     -    5s
     0     0        -    0      5605.11111 5605.11111  0.00%     -    5s

Explored 1 nodes (2002 simplex iterations) in 5.43 seconds (5.92 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 5605.11 3899.11 3879.11

Optimal solution found (tolerance 1.00e-08)
Best objective 5.605111111111e+03, best bound 5.605111111111e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5605

  Itr = 0
Collect_LB =   [843.0]
Collect_UB =   [12053.222222222226]
Collect_Hua =   [0.0]
Collect_SPObjVal =   [5605.111111111113]
Collect_MPObjValNHua =   [843.0]


Set parameter MIPGap to value 0.05
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 918834 rows, 246921 columns and 2721754 nonzeros
Model fingerprint: 0x49ec2d1c
Variable types: 1 continuous, 246920 integer (236784 binary)
Coefficient statistics:
  Matrix range     [1e-01, 1e+10]
  Objective range  [1e+00, 2e+01]
```

```
  Bounds range     [1e+00, 1e+00]
  RHS range        [1e+00, 2e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 718229 rows and 223947 columns (presolve time = 5s) ...
Presolve removed 726369 rows and 224600 columns (presolve time = 10s) ...
Presolve removed 852160 rows and 234271 columns
Presolve time: 13.24s
Presolved: 66674 rows, 12650 columns, 250807 nonzeros
Variable types: 1 continuous, 12649 integer (10481 binary)

Deterministic concurrent LP optimizer: primal and dual simplex (primal and dual model)
Showing first log only...

Root relaxation presolved: 12650 rows, 79324 columns, 263457 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    6.4481111e+03   0.000000e+00   3.761177e+04     14s
Concurrent spin time: 0.17s

Solved with dual simplex (primal model)

Root relaxation: objective 6.448111e+03, 6967 iterations, 1.15 seconds (1.44 work units)
Total elapsed time = 15.80s

     Nodes    |    Current Node    |     Objective Bounds      |     Work
  Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

     0     0 6448.11111    0  276          - 6448.11111      -     -   16s
     0     0 6448.11111    0  707          - 6448.11111      -     -   22s
     0     0 6448.11111    0  690          - 6448.11111      -     -   22s
     0     0 6448.11111    0  620          - 6448.11111      -     -   23s
     0     0 6448.11111    0  295          - 6448.11111      -     -   40s
     0     0 6448.11111    0  289          - 6448.11111      -     -   40s
     0     0 6448.11111    0  255          - 6448.11111      -     -   43s
     0     0 6448.11111    0  257          - 6448.11111      -     -   50s
     0     0 6448.11111    0  321          - 6448.11111      -     -   51s
     0     0 6448.11111    0  330          - 6448.11111      -     -   61s
     0     0 6448.11111    0  310          - 6448.11111      -     -   63s
     0     2 6448.11111    0  310          - 6448.11111      -     -   68s
     1     4 6448.11111    1  402          - 6448.11111      - 11599   70s
     7    12 6448.11111    3  873          - 6448.11111      -  5074   75s
    15    20 6448.11111    4 1283          - 6448.11111      -  6630   85s
    19    24 6448.11111    4  597          - 6448.11111      -  6687   90s
    32    37 6448.11111    6  560          - 6448.11111      -  5545   97s
    36    58 6448.11111    7  544          - 6448.11111      -  5442  104s
    62    93 6448.11111   11  773          - 6448.11111      -  4650  113s
   103   138 6468.56851   18 2017          - 6448.11111      -  3842  125s
   198   184 6448.11111    5 1439          - 6448.11111      -  2733  132s
   295   265 6448.11111   11  700          - 6448.11111      -  2134  139s
   401   387 6448.11111   16  900          - 6448.11111      -  1700  144s
   561   556 6448.11111   26  620          - 6448.11111      -  1266  150s
   789   793 6448.11111   36  621          - 6448.11111      -   922  155s
  1086  1032 6448.11111   51  461          - 6448.11111      -   699  161s
  1377  1132 6448.11111   61  489          - 6448.11111      -   577  166s
  1543  1158 6468.11111   70 1201          - 6448.11111      -   549  172s
  1602  1159 6688.11111   29  310          - 6448.11111      -   560  198s
  1604  1160 7588.11111  187  515          - 6448.11111      -   559  208s
  1605  1161 6448.11111  150  659          - 6448.11111      -   559  223s
  1606  1162 7468.11111  358  713          - 6448.11111      -   558  229s
  1607  1162 7528.11111  599  551          - 6448.11111      -   558  243s
  1608  1163 7548.11111  410  758          - 6448.11111      -   557  249s
  1609  1164 7668.11111  215  907          - 6448.11111      -   557  267s
  1610  1164 6448.11111   51 1076          - 6448.11111      -   557  289s
  1611  1165 7508.11111  293 1044          - 6448.11111      -   556  323s
  1612  1166 7548.11111  123  990          - 6448.11111      -   556  329s
  1613  1166 7548.11111  204  961          - 6448.11111      -   556  361s
  1614  1167 7468.11111  601 1353          - 6448.11111      -   555  374s
  1615  1168 7328.11111   33  674          - 6448.11111      -   555  407s
  1616  1168 7428.11111  571  538          - 6448.11111      -   555  411s
H 1616  1109                6448.1111111 6448.11111  0.00%   555  426s

Cutting planes:
  Learned: 2
  Gomory: 1
  Cover: 471
  Implied bound: 820
  Projected implied bound: 49
  Clique: 785
```

```
  MIR: 114
  StrongCG: 80
  Flow cover: 392
  GUB cover: 51
  Zero half: 20
  RLT: 52
  Relax-and-lift: 121
  BQP: 15

Explored 1616 nodes (1293220 simplex iterations) in 426.55 seconds (991.43 work units)
Thread count was 8 (of 8 available processors)

Solution count 1: 6448.11

Optimal solution found (tolerance 5.00e-02)
Best objective 6.448111111111e+03, best bound 6.448111111111e+03, gap 0.0000%
Set parameter MIPGap to value 1e-08
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 1983204 rows, 1559473 columns and 13693357 nonzeros
Model fingerprint: 0x628abfbb
Variable types: 766961 continuous, 792512 integer (787112 binary)
Coefficient statistics:
  Matrix range     [1e-01, 1e+10]
  Objective range  [6e-05, 5e+01]
  Bounds range     [1e+00, 8e+01]
  RHS range        [8e-01, 1e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 1977412 rows and 1557598 columns
Presolve time: 4.00s
Presolved: 5792 rows, 1875 columns, 15428 nonzeros
Variable types: 6 continuous, 1869 integer (1078 binary)
Found heuristic solution: objective 4013.1111111

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    1.1588000e+04   7.539023e+03   0.000000e+00      5s
    1710    5.7831111e+03   0.000000e+00   0.000000e+00      5s

Root relaxation: objective 5.783111e+03, 1710 iterations, 0.02 seconds (0.02 work units)

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

*    0     0               0    5783.1111111 5783.11111  0.00%     -    5s

Explored 1 nodes (2218 simplex iterations) in 5.33 seconds (5.70 work units)
Thread count was 8 (of 8 available processors)

Solution count 2: 5783.11 4013.11

Optimal solution found (tolerance 1.00e-08)
Best objective 5.783111111111e+03, best bound 5.783111111111e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5783

  Itr = 1
Collect_LB =   [843.0, 6448.111111111113]
Collect_UB =   [12053.222222222226, 6626.111111111113]
Collect_Hua =   [0.0, 5605.111111111113]
Collect_SPObjVal =   [5605.111111111113, 5783.111111111113]
Collect_MPObjValNHua =   [843.0, 843.0]


Set parameter MIPGap to value 0.05
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 1348788 rows, 264417 columns and 4091262 nonzeros
Model fingerprint: 0xc30003d2
Variable types: 1 continuous, 264416 integer (244176 binary)
Coefficient statistics:
  Matrix range     [1e-01, 1e+10]
  Objective range  [1e+00, 2e+01]
  Bounds range     [1e+00, 1e+00]
```

```
  RHS range        [1e+00, 2e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 1099815 rows and 236086 columns (presolve time = 5s) ...
Presolve removed 1123080 rows and 237835 columns (presolve time = 10s) ...
Presolve removed 1123080 rows and 237835 columns (presolve time = 15s) ...
Presolve removed 1238220 rows and 246750 columns
Presolve time: 19.43s
Presolved: 110568 rows, 17667 columns, 406401 nonzeros
Variable types: 1 continuous, 17666 integer (13354 binary)

Deterministic concurrent LP optimizer: primal and dual simplex (primal and dual model)
Showing first log only...

Root relaxation presolved: 17667 rows, 128235 columns, 424068 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    6.6261111e+03   0.000000e+00   7.289923e+04     21s
   19633    6.6261111e+03   0.000000e+00   0.000000e+00     23s
   19633    6.6261111e+03   0.000000e+00   0.000000e+00     23s
Concurrent spin time: 0.35s

Solved with primal simplex

Root relaxation: objective 6.626111e+03, 19633 iterations, 3.18 seconds (4.37 work units)
Total elapsed time = 26.05s

     Nodes    |    Current Node    |     Objective Bounds      |     Work
  Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

     0     0 6626.11111    0  751          - 6626.11111      -     -   29s
     0     0 6626.11111    0  988          - 6626.11111      -     -   36s
     0     0 6626.11111    0  994          - 6626.11111      -     -   37s
     0     0 6626.11111    0  955          - 6626.11111      -     -   37s
     0     0 6626.11111    0  900          - 6626.11111      -     -   39s
     0     0 6626.11111    0  897          - 6626.11111      -     -   39s
     0     0 6626.11111    0  512          - 6626.11111      -     -   49s
     0     0 6626.11111    0  517          - 6626.11111      -     -   51s
     0     0 6626.11111    0  497          - 6626.11111      -     -   60s
     0     0 6626.11111    0  600          - 6626.11111      -     -   62s
     0     0 6626.11111    0  720          - 6626.11111      -     -   72s
     0     0 6626.11111    0  718          - 6626.11111      -     -   72s
     0     0 6626.11111    0  677          - 6626.11111      -     -   75s
     0     0 6626.11111    0  680          - 6626.11111      -     -   75s
     0     0 6626.11111    0  555          - 6626.11111      -     -   82s
     0     0 6626.11111    0  555          - 6626.11111      -     -   86s
     0     2 6626.11111    0  555          - 6626.11111      -     -  101s
     3     8 6626.11111    2  978          - 6626.11111      -  9383  109s
     7    12 6626.11111    3 1059          - 6626.11111      -  7745  113s
    11    16 6626.11111    4 1105          - 6626.11111      -  7385  118s
    15    20 6626.11111    4 1531          - 6626.11111      -  7568  125s
    19    24 6626.11111    5 1169          - 6626.11111      -  6464  133s
    23    29 6626.11111    5 1394          - 6626.11111      -  6065  136s
    32    48 6626.11111    7 1340          - 6626.11111      -  5331  145s
    49    78 6626.11111    8 1322          - 6626.11111      -  4285  162s
    92   139 6626.11111   11  582          - 6626.11111      -  3784  180s
   196   182 6626.11111    7 1254          - 6626.11111      -  2627  193s
   294   227 6626.11111    9 1193          - 6626.11111      -  2000  205s
   418   270 6626.11111   17  507          - 6626.11111      -  1562  215s
   509   307 6626.11111   36  977          - 6626.11111      -  1382  226s
   548   354 6626.11111   46  946          - 6626.11111      -  1454  239s
   608   443 6626.11111   63  952          - 6626.11111      -  1442  257s
   723   686 6626.11111  104  781          - 6626.11111      -  1340  284s
  1012  1428 6626.11111  181  783          - 6626.11111      -  1044  324s
  1256  1428 7026.11111  184 1492          - 6626.11111      -   860  325s
  1824  1981 6646.11111  423  679          - 6626.11111      -   625  348s
  2477  2434 infeasible  624               - 6626.11111      -   504  368s
  3085  3287 7246.11111  427  732          - 6626.11111      -   443  383s
  4024  3288 6766.11111  420  555          - 6626.11111      -   358  439s
  4026  3289 6906.11111  708  770          - 6626.11111      -   358  475s
  4027  3290 7246.11111  401  888          - 6626.11111      -   358  514s
  4028  3291 6846.11111   31 1293          - 6626.11111      -   358  538s
  4029  3291 7326.11111  134  733          - 6626.11111      -   358  563s
  4030  3292 7086.11111  489 1049          - 6626.11111      -   358  587s
  4031  3293 7146.11111  392 1565          - 6626.11111      -   358  634s
  4032  3293 7126.11111  535 1486          - 6626.11111      -   358  646s
  4033  3294 6846.11111  676 1254          - 6626.11111      -   357  695s
  4034  3295 7246.11111  398 1564          - 6626.11111      -   357  754s
  4035  3295 6626.11111   19 1403          - 6626.11111      -   357  838s
```

```
H 4035  3130                 6926.1111111 6626.11111  4.33%   357  860s

Cutting planes:
  Learned: 3
  Gomory: 7
  Lift-and-project: 2
  Cover: 555
  Implied bound: 648
  Projected implied bound: 43
  Clique: 1294
  MIR: 161
  StrongCG: 62
  Flow cover: 723
  GUB cover: 460
  Zero half: 36
  RLT: 62
  Relax-and-lift: 328
  BQP: 19
  PSD: 3

Explored 4035 nodes (1958117 simplex iterations) in 861.03 seconds (2094.78 work units)
Thread count was 8 (of 8 available processors)

Solution count 1: 6926.11

Optimal solution found (tolerance 5.00e-02)
Best objective 6.926111111111e+03, best bound 6.626111111111e+03, gap 4.3314%
Warning: linear constraint 488881 and linear constraint 918835 have the same name "ConSP25_1[0,0]"
Set parameter MIPGap to value 1e-08
Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)

CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 1983204 rows, 1559473 columns and 13693357 nonzeros
Model fingerprint: 0x6e000478
Variable types: 766961 continuous, 792512 integer (787112 binary)
Coefficient statistics:
  Matrix range     [1e-01, 1e+10]
  Objective range  [6e-05, 5e+01]
  Bounds range     [1e+00, 8e+01]
  RHS range        [8e-01, 1e+10]
Warning: Model contains large matrix coefficients
Warning: Model contains large rhs
         Consider reformulating model or setting NumericFocus parameter
         to avoid numerical issues.
Presolve removed 1977003 rows and 1557513 columns
Presolve time: 3.81s
Presolved: 6201 rows, 1960 columns, 16532 nonzeros
Variable types: 6 continuous, 1954 integer (1122 binary)
Found heuristic solution: objective 3988.1111111

Root relaxation: objective 5.783111e+03, 1966 iterations, 0.03 seconds (0.02 work units)

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

H    0     0                    5783.1111111 17677.7778   206%     -    4s
     0     0        -    0      5783.11111 5783.11111  0.00%     -    4s

Explored 1 nodes (2788 simplex iterations) in 5.09 seconds (5.56 work units)
Thread count was 8 (of 8 available processors)

Solution count 2: 5783.11 3988.11

Optimal solution found (tolerance 1.00e-08)
Best objective 5.783111111111e+03, best bound 5.783111111111e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5783

  Itr = 2
Collect_LB =   [843.0, 6448.111111111113, 6926.111111111113]
Collect_UB =   [12053.222222222226, 6626.111111111113, 6626.111111111113]
Collect_Hua =   [0.0, 5605.111111111113, 5783.111111111113]
Collect_SPObjVal =   [5605.111111111113, 5783.111111111113, 5783.111111111113]
Collect_MPObjValNHua =   [843.0, 843.0, 1143.0]


  Reach the termination conditions, stop iteration
  Values adopted from the judgeCount's th iteration, and Itr = {2}, judgeCount = {1}

~~~~~~~~~~judgeCount = 1, SPObj_SPF = 5783.111111111113
Vessel i: 0:      pi: 0-7,      ai-di: 3-34,      gi_SP-gpi_SP: 0.000000-0.000000,      ai_SP-di: 3-34,      taoi-deltai: 3-32,      taoPi_SP-deltaPi_SP: 3-32,      betaNi: 29
,      bi: 29
```

```
499 Vessel i: 1:    pi: 13-18,    ai-di: 12-22,    gi_SP-gpi_SP: 0.000000-0.000000,    ai_SP-di: 12-22,    taoi-deltai: 12-20,    taoPi_SP-deltaPi_SP: 12-20,
    betaNi: 8,    bi: 8
500 Vessel i: 2:    pi: 14-19,    ai-di: 27-35,    gi_SP-gpi_SP: 0.000000-0.000000,    ai_SP-di: 27-35,    taoi-deltai: 27-33,    taoPi_SP-deltaPi_SP: 27-33,
    betaNi: 6,    bi: 6
501 Vessel i: 3:    pi: 7-14,    ai-di: 24-60,    gi_SP-gpi_SP: 0.000000-0.000000,    ai_SP-di: 24-60,    taoi-deltai: 24-58,    taoPi_SP-deltaPi_SP: 24-58,    betaNi
    : 34,    bi: 34
502 Vessel i: 4:    pi: 14-19,    ai-di: 35-41,    gi_SP-gpi_SP: 0.000000-0.000000,    ai_SP-di: 35-41,    taoi-deltai: 35-39,    taoPi_SP-deltaPi_SP: 35-39,
    betaNi: 4,    bi: 4
503 Vessel i: 5:    pi: 20-26,    ai-di: 31-60,    gi_SP-gpi_SP: 0.000000-1.000000,    ai_SP-di: 31-60,    taoi-deltai: 31-46,    taoPi_SP-deltaPi_SP: 31-46,
    betaNi: 15,    bi: 15
504 Vessel i: 6:    pi: 15-21,    ai-di: 40-80,    gi_SP-gpi_SP: 1.000000-0.600000,    ai_SP-di: 48-80,    taoi-deltai: 48-72,    taoPi_SP-deltaPi_SP: 48-72,
    betaNi: 24,    bi: 24
505 Vessel i: 7:    pi: 28-34,    ai-di: 43-72,    gi_SP-gpi_SP: 0.800000-0.200000,    ai_SP-di: 51-72,    taoi-deltai: 51-64,    taoPi_SP-deltaPi_SP: 51-64,
    betaNi: 13,    bi: 13
506
507 round LB =  [843, 6448, 6926]
508 round UB =  [12053, 6626, 6626]
509 round Hua =  [0, 5605, 5783]
510 round SPObjVal =  [5605, 5783, 5783]
511 round MPObjValNHua =  [843, 843, 1143]
512
513 Time: 1696.000000
514
515
516
517
```