```
"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=52157

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 644962 rows, 64824 columns and 1819064 nonzeros
Model fingerprint: 0x82863e15
Variable types: 1 continuous, 64823 integer (64779 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 428716 rows and 34151 columns (presolve time = 5s) ...
Presolve removed 531943 rows and 45359 columns
Presolve time: 8.63s
Presolved: 113019 rows, 19465 columns, 304981 nonzeros
Variable types: 0 continuous, 19465 integer (19432 binary)

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

Root relaxation presolved: 19465 rows, 132484 columns, 324446 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    5.5300000e+02   0.000000e+00   8.350000e+02      9s
Concurrent spin time: 0.02s

Solved with dual simplex (primal model)

Root relaxation: objective 5.530000e+02, 2205 iterations, 0.42 seconds (0.40 work units)
Total elapsed time = 10.05s

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

     0     0  553.00000    0    8          -  553.00000      -     -   10s
H    0     0                     553.0000000  553.00000  0.00%     -   10s
     0     0  553.00000    0    8  553.00000  553.00000  0.00%     -   10s

Explored 1 nodes (6243 simplex iterations) in 10.37 seconds (18.95 work units)
Thread count was 8 (of 8 available processors)

Solution count 1: 553

Optimal solution found (tolerance 1.00e-10)
Best objective 5.530000000000e+02, best bound 5.530000000000e+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 3645246 rows, 2881123 columns and 25540934 nonzeros
Model fingerprint: 0xb4e630a3
Variable types: 1422995 continuous, 1458128 integer (1450703 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 3642026 rows and 2879733 columns (presolve time = 5s) ...
Presolve removed 3644073 rows and 2880702 columns
Presolve time: 7.68s
Presolved: 1173 rows, 421 columns, 3135 nonzeros
Variable types: 0 continuous, 421 integer (258 binary)
Found heuristic solution: objective 4065.0394527
Found heuristic solution: objective 4110.0394527

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    5.6910395e+03   4.299375e+02   0.000000e+00     10s
     395    4.5860395e+03   0.000000e+00   0.000000e+00     10s

Root relaxation: objective 4.586039e+03, 395 iterations, 0.00 seconds (0.00 work units)

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

H    0     0                    4586.0394527 6851.03945  49.4%     -    9s
     0     0          -    0     4586.03945 4586.03945  0.00%     -    9s

Explored 1 nodes (596 simplex iterations) in 10.06 seconds (11.02 work units)
Thread count was 8 (of 8 available processors)

Solution count 3: 4586.04 4110.04 4065.04

Optimal solution found (tolerance 1.00e-08)
Best objective 4.586039452672e+03, best bound 4.586039452672e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□4586

  Itr = 0
Collect_LB =   [553.0]
Collect_UB =   [9725.078905344453]
Collect_Hua =   [0.0]
Collect_SPObjVal =   [4586.039452672227]
Collect_MPObjValNHua =   [553.0]


Set parameter TimeLimit to value 7200
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 1436799 rows, 434457 columns and 4288516 nonzeros
Model fingerprint: 0xabdb667a
Variable types: 1 continuous, 434456 integer (420519 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 1224534 rows and 407492 columns (presolve time = 5s) ...
Presolve removed 1279105 rows and 412505 columns (presolve time = 10s) ...
Presolve removed 1279105 rows and 412505 columns (presolve time = 15s) ...
Presolve removed 1326006 rows and 418524 columns
Presolve time: 16.48s
Presolved: 110793 rows, 15933 columns, 346852 nonzeros
Variable types: 1 continuous, 15932 integer (13439 binary)

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

Root relaxation presolved: 15933 rows, 126726 columns, 362785 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    5.1461823e+03   0.000000e+00   7.526125e+03     17s
Concurrent spin time: 0.16s

```

```
Solved with dual simplex (primal model)

Root relaxation: objective 5.146182e+03, 6864 iterations, 1.30 seconds (1.55 work units)
Total elapsed time = 20.26s

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

     0     0 5146.18231    0  208          - 5146.18231      -     -   21s
     0     0 5146.18231    0  483          - 5146.18231      -     -   23s
     0     0 5146.18231    0  472          - 5146.18231      -     -   23s
     0     0 5146.18231    0  385          - 5146.18231      -     -   24s
     0     0 5146.18231    0  175          - 5146.18231      -     -   28s
     0     0 5146.18231    0  248          - 5146.18231      -     -   28s
     0     0 5146.18231    0  157          - 5146.18231      -     -   31s
     0     0 5146.18231    0  170          - 5146.18231      -     -   32s
     0     0 5146.18231    0  187          - 5146.18231      -     -   34s
     0     0 5146.18231    0  210          - 5146.18231      -     -   34s
     0     0 5146.18231    0  146          - 5146.18231      -     -   36s
     0     0 5146.18231    0  189          - 5146.18231      -     -   37s
     0     0 5146.18231    0  121          - 5146.18231      -     -   39s
     0     0 5146.18231    0  242          - 5146.18231      -     -   40s
     0     0 5146.18231    0   96         - 5146.18231      -     -   42s
     0     0 5146.18231    0  158          - 5146.18231      -     -   42s
     0     0 5146.18231    0   69         - 5146.18231      -     -   44s
     0     0 5146.18231    0   67         - 5146.18231      -     -   44s
     0     0 5146.18231    0  169          - 5146.18231      -     -   44s
     0     0 5146.18231    0  123          - 5146.18231      -     -   47s
     0     0 5146.18231    0   93         - 5146.18231      -     -   48s
H    0     0                    5146.1823098 5146.18231  0.00%     -   57s
     0     0 5146.18231    0   93 5146.18231 5146.18231  0.00%     -   57s

Cutting planes:
  Learned: 5
  Gomory: 2
  Cover: 485
  Implied bound: 215
  Clique: 2006
  MIR: 142
  StrongCG: 63
  Flow cover: 20
  GUB cover: 56
  Zero half: 18
  Network: 1
  RLT: 71
  Relax-and-lift: 428
  BQP: 30
  PSD: 6

Explored 1 nodes (116451 simplex iterations) in 57.66 seconds (117.93 work units)
Thread count was 8 (of 8 available processors)

Solution count 1: 5146.18

Optimal solution found (tolerance 5.00e-02)
Best objective 5.146182309815e+03, best bound 5.146182309815e+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 3645246 rows, 2881123 columns and 25540934 nonzeros
Model fingerprint: 0xbd923ecc
Variable types: 1422995 continuous, 1458128 integer (1450703 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 3640785 rows and 2879399 columns (presolve time = 5s) ...
Presolve removed 3641396 rows and 2879782 columns
Presolve time: 7.29s
Presolved: 3850 rows, 1341 columns, 10283 nonzeros
Variable types: 10 continuous, 1331 integer (782 binary)
Found heuristic solution: objective 3696.4618664

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
```

```
       0    9.3040000e+03   4.138728e+03   0.000000e+00      9s
    1146    5.0332444e+03   0.000000e+00   0.000000e+00      9s

Root relaxation: objective 5.033244e+03, 1146 iterations, 0.02 seconds (0.01 work units)

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

     0     0 5033.24444    0   15 3696.46187 5033.24444  36.2%     -    9s
H    0     0                    5032.4444444 5033.24444  0.02%     -    9s

Cutting planes:
  Learned: 6
  Gomory: 1

Explored 1 nodes (1620 simplex iterations) in 9.74 seconds (10.39 work units)
Thread count was 8 (of 8 available processors)

Solution count 2: 5032.44 3696.46

Optimal solution found (tolerance 1.00e-08)
Best objective 5.032444444444e+03, best bound 5.032444444444e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5032

  Itr = 1
Collect_LB =   [553.0, 5146.1823098150835]
Collect_UB =   [9725.078905344453, 5592.587301587302]
Collect_Hua =   [0.0, 4586.039452672227]
Collect_SPObjVal =   [4586.039452672227, 5032.444444444445]
Collect_MPObjValNHua =   [553.0, 560.1428571428569]


Set parameter TimeLimit to value 7200
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 2220444 rows, 458514 columns and 6749721 nonzeros
Model fingerprint: 0x2f8b23b9
Variable types: 1 continuous, 458513 integer (430683 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 1937562 rows and 424958 columns (presolve time = 5s) ...
Presolve removed 1997923 rows and 429512 columns (presolve time = 10s) ...
Presolve removed 2006776 rows and 430276 columns (presolve time = 18s) ...
Presolve removed 2006776 rows and 436285 columns (presolve time = 22s) ...
Presolve removed 2058760 rows and 436864 columns
Presolve time: 22.87s
Presolved: 161684 rows, 21650 columns, 539988 nonzeros
Variable types: 1 continuous, 21649 integer (16720 binary)

Deterministic concurrent LP optimizer: primal simplex, dual simplex, and barrier
Showing barrier log only...

Root relaxation presolved: 21650 rows, 183334 columns, 561638 nonzeros

Root barrier log...

Ordering time: 2.62s

Barrier statistics:
 Dense cols : 35
 Free vars  : 786
 AA' NZ     : 5.695e+05
 Factor NZ  : 1.366e+07 (roughly 200 MB of memory)
 Factor Ops : 2.581e+10 (roughly 1 second per iteration)
 Threads    : 1

                  Objective                Residual
Iter       Primal          Dual         Primal    Dual     Compl     Time
   0  -4.91879034e+07  3.22044434e+04  2.30e+04 1.39e+03  7.73e+04    28s

Barrier performed 0 iterations in 28.20 seconds (48.62 work units)
Barrier solve interrupted - model solved by another algorithm
```

```
Concurrent spin time: 1.07s (can be avoided by choosing Method=3)

Solved with primal simplex

Root relaxation: objective 5.605444e+03, 24033 iterations, 4.66 seconds (5.56 work units)
Total elapsed time = 32.52s
Total elapsed time = 35.50s

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

     0     0 5605.44444    0  514          - 5605.44444      -     -   37s
     0     0 5605.44444    0  512          - 5605.44444      -     -   37s
     0     0 5605.44444    0  767          - 5605.44444      -     -   43s
     0     0 5605.44444    0  849          - 5605.44444      -     -   46s
     0     0 5605.44444    0  256          - 5605.44444      -     -   53s
     0     0 5605.44444    0  233          - 5605.44444      -     -   54s
     0     0 5605.44444    0  274          - 5605.44444      -     -   60s
     0     0 5605.44444    0  313          - 5605.44444      -     -   60s
     0     0 5605.44444    0  291          - 5605.44444      -     -   61s
     0     0 5605.44444    0  283          - 5605.44444      -     -   64s
     0     0 5605.44444    0  381          - 5605.44444      -     -   65s
     0     0 5605.44444    0  172          - 5605.44444      -     -   69s
     0     0 5605.44444    0  245          - 5605.44444      -     -   70s
     0     0 5605.44444    0  128          - 5605.44444      -     -   74s
     0     0 5605.44444    0  125          - 5605.44444      -     -   74s
     0     0 5605.44444    0  203          - 5605.44444      -     -   74s
     0     0 5605.44444    0  126          - 5605.44444      -     -   78s
     0     0 5605.44444    0  126          - 5605.44444      -     -   80s
H    0     0                    5605.4444444 5605.44444  0.00%     -   97s
     0     0 5605.44444    0  126 5605.44444 5605.44444  0.00%     -   97s

Cutting planes:
  Learned: 28
  Gomory: 4
  Lift-and-project: 4
  Cover: 474
  Implied bound: 425
  Clique: 2376
  MIR: 183
  StrongCG: 170
  Flow cover: 139
  GUB cover: 280
  Zero half: 15
  RLT: 113
  Relax-and-lift: 431
  BQP: 34
  PSD: 2

Explored 1 nodes (182271 simplex iterations) in 97.19 seconds (214.24 work units)
Thread count was 8 (of 8 available processors)

Solution count 1: 5605.44

Optimal solution found (tolerance 5.00e-02)
Best objective 5.605444444444e+03, best bound 5.605444444444e+03, gap 0.0000%
Warning: linear constraint 653155 and linear constraint 1436800 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 3645246 rows, 2881123 columns and 25540934 nonzeros
Model fingerprint: 0xe01d2462
Variable types: 1422995 continuous, 1458128 integer (1450703 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 3640977 rows and 2879450 columns (presolve time = 5s) ...
Presolve removed 3641594 rows and 2879840 columns
Presolve time: 7.41s
Presolved: 3652 rows, 1283 columns, 9779 nonzeros
Variable types: 10 continuous, 1273 integer (757 binary)
Found heuristic solution: objective 3669.4348047

Root simplex log...
```

```
416
417  Iteration    Objective       Primal Inf.    Dual Inf.      Time
418         0    8.7840000e+03   2.960713e+03   0.000000e+00      9s
419      1137    5.0444444e+03   0.000000e+00   0.000000e+00      9s
420
421  Root relaxation: objective 5.044444e+03, 1137 iterations, 0.02 seconds (0.01 work units)
422
423      Nodes    |    Current Node    |     Objective Bounds      |     Work
424   Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time
425
426      0     0 5044.44444    0   48 3669.43480 5044.44444  37.5%     -    9s
427      0     0 5044.44444    0   46 3669.43480 5044.44444  37.5%     -    9s
428  H   0     0                       4025.6856262 5044.44444  25.3%     -    9s
429  H   0     0                       4209.1291096 5044.44444  19.8%     -    9s
430  H   0     0                       4735.4914569 5044.44444  6.52%     -    9s
431  H   0     0                       5016.6025680 5044.44444  0.55%     -    9s
432  H   0     0                       5019.4444444 5041.94249  0.45%     -    9s
433  H   0     0                       5019.7202709 5041.94249  0.44%     -    9s
434  H   0     0                       5036.3869376 5041.94249  0.11%     -    9s
435  H   0     0                       5039.7202709 5041.94249  0.04%     -    9s
436      0     0 5039.72027    0   17 5039.72027 5039.72027  0.00%     -    9s
437
438  Cutting planes:
439    Gomory: 8
440    Lift-and-project: 2
441    Cover: 5
442    Implied bound: 1
443    Clique: 41
444    MIR: 2
445    Flow cover: 4
446    Zero half: 15
447
448  Explored 1 nodes (2427 simplex iterations) in 10.14 seconds (10.36 work units)
449  Thread count was 8 (of 8 available processors)
450
451  Solution count 9: 5039.72 5036.39 5019.72 ... 3669.43
452
453  Optimal solution found (tolerance 1.00e-08)
454  Best objective 5.039720270938e+03, best bound 5.039720270938e+03, gap 0.0000%
455  SP is solved
456  SP's optimal solution is'□5039
457
458    Itr = 2
459  Collect_LB =   [553.0, 5146.1823098150835, 5605.444444444445]
460  Collect_UB =   [9725.078905344453, 5592.587301587302, 5592.587301587302]
461  Collect_Hua =   [0.0, 4586.039452672227, 5032.444444444445]
462  Collect_SPObjVal =   [4586.039452672227, 5032.444444444445, 5039.720270937742]
463  Collect_MPObjValNHua =   [553.0, 560.1428571428569, 573.0]
464
465
466    Reach the termination conditions, stop iteration
467    Values adopted from the judgeCount's th iteration, and Itr = {2}, judgeCount = {1}
468
469  ~~~~~~~~~~judgeCount = 1, SPObj_SPF = 5032.444444444445
470  Vessel i: 0:     pi: 0-5,     ai-di: 3-12,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 3-12,     taoi-deltai: 3-7,     taoPi_SP-deltaPi_SP: 3-7,     betaNi: 4,     bi
       : 4
471  Vessel i: 1:     pi: 10-15,     ai-di: 4-25,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 4-25,     taoi-deltai: 4-18,     taoPi_SP-deltaPi_SP: 4-18,     betaNi: 14
       ,     bi: 14
472  Vessel i: 2:     pi: 5-10,     ai-di: 9-27,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 9-27,     taoi-deltai: 9-17,     taoPi_SP-deltaPi_SP: 9-17,     betaNi: 8
       ,     bi: 8
473  Vessel i: 3:     pi: 22-27,     ai-di: 9-30,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 9-30,     taoi-deltai: 9-17,     taoPi_SP-deltaPi_SP: 9-17,     betaNi: 8
       ,     bi: 8
474  Vessel i: 4:     pi: 15-20,     ai-di: 14-29,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 14-29,     taoi-deltai: 14-18,     taoPi_SP-deltaPi_SP: 14-18,
       betaNi: 4,     bi: 4
475  Vessel i: 5:     pi: 28-34,     ai-di: 16-28,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 16-28,     taoi-deltai: 16-26,     taoPi_SP-deltaPi_SP: 16-26,
       betaNi: 10,     bi: 10
476  Vessel i: 6:     pi: 15-20,     ai-di: 25-55,     gi_SP-gpi_SP: 0.000000-1.000000,     ai_SP-di: 25-55,     taoi-deltai: 25-36,     taoPi_SP-deltaPi_SP: 25-36,
       betaNi: 11,     bi: 11
477  Vessel i: 7:     pi: 28-34,     ai-di: 32-60,     gi_SP-gpi_SP: 1.000000-0.400000,     ai_SP-di: 40-60,     taoi-deltai: 38-46,     taoPi_SP-deltaPi_SP: 40-46,
       betaNi: 8,     bi: 8
478  Vessel i: 8:     pi: 19-24,     ai-di: 36-80,     gi_SP-gpi_SP: 1.000000-0.600000,     ai_SP-di: 46-80,     taoi-deltai: 46-62,     taoPi_SP-deltaPi_SP: 46-62,
       betaNi: 16,     bi: 16
479  Vessel i: 9:     pi: 24-29,     ai-di: 41-67,     gi_SP-gpi_SP: 0.600000-1.000000,     ai_SP-di: 45-67,     taoi-deltai: 47-58,     taoPi_SP-deltaPi_SP: 47-58,
       betaNi: 11,     bi: 11
480  Vessel i: 10:     pi: 14-19,     ai-di: 50-82,     gi_SP-gpi_SP: 0.400000-0.000000,     ai_SP-di: 52-82,     taoi-deltai: 53-66,     taoPi_SP-deltaPi_SP: 53-66,
       betaNi: 13,     bi: 13
481
482  round LB =   [553, 5146, 5605]
483  round UB =   [9725, 5593, 5593]
484  round Hua =   [0, 4586, 5032]
485  round SPObjVal =   [4586, 5032, 5040]
486  round MPObjValNHua =   [553, 560, 573]
487
488  Time: 858.000000
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490
491
492