```
"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=46634

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_BDC.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 557467 rows, 58701 columns and 1576383 nonzeros
Model fingerprint: 0xaf759b0a
Variable types: 1 continuous, 58700 integer (58660 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 342574 rows and 28008 columns (presolve time = 5s) ...
Presolve removed 444834 rows and 38927 columns
Presolve time: 8.44s
Presolved: 112633 rows, 19774 columns, 307906 nonzeros
Variable types: 0 continuous, 19774 integer (19744 binary)

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

Root relaxation presolved: 19774 rows, 132407 columns, 327680 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    6.4900000e+02   0.000000e+00   9.500000e+02      9s
Concurrent spin time: 0.00s

Solved with dual simplex (primal model)

Root relaxation: objective 6.490000e+02, 2260 iterations, 0.43 seconds (0.44 work units)

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

     0     0  649.00000    0   28          -  649.00000      -     -    9s
     0     0  649.00000    0   91          -  649.00000      -     -   10s
     0     0  649.00000    0   84          -  649.00000      -     -   10s
H    0     0                4029.0000000  649.00000  83.9%     -   11s
H    0     0                1789.0000000  649.00000  63.7%     -   11s
H    0     0                 709.0000000  649.00000  8.46%     -   11s
     0     0  649.00000    0  188  709.00000  649.00000  8.46%     -   11s
     0     0  649.00000    0   15  709.00000  649.00000  8.46%     -   15s
H    0     0                 649.0000000  649.00000  0.00%     -   15s

Cutting planes:
  Gomory: 3
  Cover: 75
  Implied bound: 1
  MIR: 49
  StrongCG: 50
  GUB cover: 1
  Zero half: 4
  Relax-and-lift: 3

Explored 1 nodes (10906 simplex iterations) in 15.71 seconds (29.16 work units)
Thread count was 8 (of 8 available processors)

Solution count 4: 649 709 1789 4029

```

```
Optimal solution found (tolerance 1.00e-10)
Best objective 6.490000000000e+02, best bound 6.490000000000e+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 3035724 rows, 2395885 columns and 21185430 nonzeros
Model fingerprint: 0xddb9f384
Variable types: 1181973 continuous, 1213912 integer (1207162 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 3032277 rows and 2394662 columns (presolve time = 5s) ...
Presolve removed 3033403 rows and 2394999 columns
Presolve time: 6.32s
Presolved: 2321 rows, 886 columns, 6181 nonzeros
Variable types: 10 continuous, 876 integer (524 binary)
Found heuristic solution: objective 3987.9062900

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    8.4772222e+03   2.469038e+03   0.000000e+00      8s
     734    5.0084444e+03   0.000000e+00   0.000000e+00      8s

Root relaxation: objective 5.008444e+03, 734 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 5008.44444    0   38 3987.90629 5008.44444  25.6%     -    7s
H    0     0                4071.6766934 5008.44444  23.0%     -    7s
H    0     0                4115.0100267 5008.44444  21.7%     -    8s
     0     0 5008.44444    0   19 4115.01003 5008.44444  21.7%     -    8s
H    0     0                5004.9115810 5008.44444  0.07%     -    8s
H    0     0                5007.5041736 5008.44444  0.02%     -    8s
     0     0 5008.30159    0   12 5007.50417 5008.30159  0.02%     -    8s
     0     0 5008.30159    0   10 5007.50417 5008.30159  0.02%     -    8s
H    0     0                5008.3015873 5008.30159  0.00%     -    8s

Cutting planes:
  Learned: 1
  Cover: 12
  Implied bound: 19
  Clique: 8
  MIR: 11
  Zero half: 2
  RLT: 2
  Relax-and-lift: 16

Explored 1 nodes (1461 simplex iterations) in 8.46 seconds (8.98 work units)
Thread count was 8 (of 8 available processors)

Solution count 6: 5008.3 5007.5 5004.91 ... 3987.91

Optimal solution found (tolerance 1.00e-08)
Best objective 5.008301587302e+03, best bound 5.008301587302e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5008

  Itr = 0
Collect_LB =   [649.0]
Collect_UB =   [10665.603174603173]
Collect_Hua =   [0.0]
Collect_SPObjVal =   [5008.301587301587]
Collect_MPObjValNHua =   [649.0]


Set parameter TimeLimit to value 12000
Set parameter MIPGap to value 0.0005
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 566499 rows, 344301 columns and 1585480 nonzeros
```

```
Model fingerprint: 0x58f0b5ee
Variable types: 1 continuous, 344300 integer (344260 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 414857 rows and 324178 columns (presolve time = 5s) ...
Presolve removed 512797 rows and 334811 columns
Presolve time: 8.50s
Presolved: 53702 rows, 9490 columns, 140676 nonzeros
Variable types: 0 continuous, 9490 integer (9460 binary)
Root relaxation presolved: 9490 rows, 63192 columns, 150166 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0     handle free variables                         9s
    6890    5.6657666e+03   1.544375e+01   0.000000e+00     10s
    6928    5.6644444e+03   0.000000e+00   0.000000e+00     10s
    6928    5.6644444e+03   0.000000e+00   0.000000e+00     10s

Root relaxation: objective 5.664444e+03, 6928 iterations, 1.24 seconds (2.54 work units)

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

     0     0 5664.44444    0   11          - 5664.44444      -     -   10s
H    0     0                6324.4444444 5664.44444  10.4%     -   11s
     0     0 5664.44444    0  120 6324.44444 5664.44444  10.4%     -   11s
H    0     0                6044.4444444 5664.44444  6.29%     -   11s
     0     0 5664.44444    0   34 6044.44444 5664.44444  6.29%     -   12s
     0     0 5664.44444    0   33 6044.44444 5664.44444  6.29%     -   12s
     0     0 5664.44444    0   56 6044.44444 5664.44444  6.29%     -   12s
H    0     0                5864.4444444 5664.44444  3.41%     -   12s
     0     0 5664.44444    0   61 5864.44444 5664.44444  3.41%     -   12s
     0     0 5664.44444    0  174 5864.44444 5664.44444  3.41%     -   13s
     0     0 5664.44444    0   25 5864.44444 5664.44444  3.41%     -   13s
     0     0 5664.44444    0  164 5864.44444 5664.44444  3.41%     -   14s
     0     0 5664.44444    0  160 5864.44444 5664.44444  3.41%     -   14s
     0     0 5664.44444    0  160 5864.44444 5664.44444  3.41%     -   14s
     0     0 5664.44444    0   75 5864.44444 5664.44444  3.41%     -   14s
     0     0 5664.44444    0   72 5864.44444 5664.44444  3.41%     -   15s
     0     0 5664.44444    0  119 5864.44444 5664.44444  3.41%     -   15s
     0     0 5664.44444    0  118 5864.44444 5664.44444  3.41%     -   15s
H    0     0                5664.4444444 5664.44444  0.00%     -   15s
     0     0 5664.44444    0   69 5664.44444 5664.44444  0.00%     -   15s

Cutting planes:
  Learned: 2
  Gomory: 3
  Cover: 120
  Implied bound: 1200
  Clique: 285
  MIR: 71
  StrongCG: 45
  GUB cover: 8
  Zero half: 11
  RLT: 42
  Relax-and-lift: 8
  BQP: 6
  PSD: 2

Explored 1 nodes (40964 simplex iterations) in 15.65 seconds (24.12 work units)
Thread count was 8 (of 8 available processors)

Solution count 4: 5664.44 5864.44 6044.44 6324.44

Optimal solution found (tolerance 5.00e-04)
Best objective 5.664444444444e+03, best bound 5.664444444444e+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 3035724 rows, 2395885 columns and 21185430 nonzeros
Model fingerprint: 0x71f00d4f
Variable types: 1181973 continuous, 1213912 integer (1207162 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 3030763 rows and 2394247 columns (presolve time = 5s) ...
Presolve removed 3031130 rows and 2394373 columns
Presolve time: 6.18s
Presolved: 4594 rows, 1512 columns, 12213 nonzeros
Variable types: 10 continuous, 1502 integer (875 binary)
Found heuristic solution: objective 4059.8240692

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    9.7032222e+03   6.479138e+03   0.000000e+00      8s
    1388    5.6174444e+03   0.000000e+00   0.000000e+00      8s

Root relaxation: objective 5.617444e+03, 1388 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 5617.44444    0   40 4059.82407 5617.44444  38.4%     -    7s
H    0     0                4579.6044479 5617.44444  22.7%     -    7s
H    0     0                5081.6470308 5617.44444  10.5%     -    7s
     0     0 5617.44444    0   37 5081.64703 5617.44444  10.5%     -    7s
H    0     0                5614.0544382 5617.44444  0.06%     -    8s
     0     0 5617.17864    0   20 5614.05444 5617.17864  0.06%     -    8s

Cutting planes:
  Cover: 3
  Clique: 12
  MIR: 3
  Flow cover: 1
  Zero half: 3
  RLT: 2

Explored 1 nodes (2401 simplex iterations) in 8.33 seconds (8.86 work units)
Thread count was 8 (of 8 available processors)

Solution count 4: 5614.05 5081.65 4579.6 4059.82

Optimal solution found (tolerance 1.00e-08)
Best objective 5.614054438168e+03, best bound 5.614054438168e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5614

 Itr = 1
Collect_LB =   [649.0, 5664.444444444443]
Collect_UB =   [10665.603174603173, 6270.1972953106]
Collect_Hua =   [0.0, 5008.301587301587]
Collect_SPObjVal =   [5008.301587301587, 5614.054438167743]
Collect_MPObjValNHua =   [649.0, 656.1428571428569]


Set parameter TimeLimit to value 12000
Set parameter MIPGap to value 0.0005
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 566500 rows, 344301 columns and 1585501 nonzeros
Model fingerprint: 0x92266547
Variable types: 1 continuous, 344300 integer (344260 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 415073 rows and 324162 columns (presolve time = 5s) ...
Presolve removed 513001 rows and 334836 columns
Presolve time: 8.51s
Presolved: 53499 rows, 9465 columns, 140196 nonzeros
Variable types: 0 continuous, 9465 integer (9435 binary)
```

```
Root relaxation presolved: 9465 rows, 62964 columns, 149661 nonzeros


Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0      handle free variables                          9s
    6991    6.2790544e+03   0.000000e+00   0.000000e+00     10s
    6991    6.2790544e+03   0.000000e+00   0.000000e+00     10s

Root relaxation: objective 6.279054e+03, 6991 iterations, 1.16 seconds (2.34 work units)
Total elapsed time = 10.08s

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

     0     0 6279.05444    0   29          - 6279.05444      -     -   10s
     0     0 6279.05444    0   29          - 6279.05444      -     -   10s
     0     0 6279.05444    0   96          - 6279.05444      -     -   10s
     0     0 6279.05444    0   91          - 6279.05444      -     -   10s
     0     0 6279.05444    0   68          - 6279.05444      -     -   11s
     0     0 6279.05444    0  102          - 6279.05444      -     -   11s
H    0     0                6299.0544382 6279.05444  0.32%     -   12s
     0     0 6279.05444    0   26 6299.05444 6279.05444  0.32%     -   13s
H    0     0                6279.0544382 6279.05444  0.00%     -   13s
     0     0 6279.05444    0   26 6279.05444 6279.05444  0.00%     -   13s

Cutting planes:
  Learned: 1
  Gomory: 5
  Cover: 68
  Implied bound: 1057
  Clique: 224
  MIR: 22
  StrongCG: 13
  GUB cover: 2
  Zero half: 8
  RLT: 2
  Relax-and-lift: 201

Explored 1 nodes (25706 simplex iterations) in 13.39 seconds (21.83 work units)
Thread count was 8 (of 8 available processors)

Solution count 2: 6279.05 6299.05

Optimal solution found (tolerance 5.00e-04)
Best objective 6.279054438168e+03, best bound 6.279054438168e+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 3035724 rows, 2395885 columns and 21185430 nonzeros
Model fingerprint: 0xf1374b93
Variable types: 1181973 continuous, 1213912 integer (1207162 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 3030897 rows and 2394264 columns (presolve time = 5s) ...
Presolve removed 3030979 rows and 2394287 columns
Presolve time: 6.17s
Presolved: 4745 rows, 1598 columns, 12583 nonzeros
Variable types: 10 continuous, 1588 integer (927 binary)
Found heuristic solution: objective 4046.4907358

Root simplex log...

Iteration    Objective       Primal Inf.    Dual Inf.      Time
       0    1.0449000e+04   3.783137e+03   0.000000e+00      8s
    1405    5.7134444e+03   0.000000e+00   0.000000e+00      8s

Root relaxation: objective 5.713444e+03, 1405 iterations, 0.01 seconds (0.01 work units)

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

     0     0 5713.44444    0   38 4046.49074 5713.44444  41.2%     -    7s
```

```
     0     0 5713.44444    0   18 4046.49074 5713.44444  41.2%     -    7s
H    0     0                    5073.3521103 5713.44444  12.6%     -    7s
H    0     0                    5388.0187770 5713.44444  6.04%     -    8s
H    0     0                    5708.3928106 5713.44444  0.09%     -    8s
     0     0 5713.17864    0   10 5708.39281 5713.17864  0.08%     -    8s
     0     0     cutoff    0      5708.39281 5708.39281  0.00%     -    8s

Cutting planes:
  Gomory: 7
  Cover: 4
  Implied bound: 2
  Clique: 40
  MIR: 2
  Zero half: 3
  RLT: 1

Explored 1 nodes (2669 simplex iterations) in 8.36 seconds (8.77 work units)
Thread count was 8 (of 8 available processors)

Solution count 4: 5708.39 5388.02 5073.35 4046.49

Optimal solution found (tolerance 1.00e-08)
Best objective 5.708392810563e+03, best bound 5.708392810563e+03, gap 0.0000%
SP is solved
SP's optimal solution is'□5708

 Itr = 2
Collect_LB =   [649.0, 5664.444444444443, 6279.054438167743]
Collect_UB =   [10665.603174603173, 6270.1972953106, 6270.1972953106]
Collect_Hua =   [0.0, 5008.301587301587, 5614.054438167743]
Collect_SPObjVal =   [5008.301587301587, 5614.054438167743, 5708.392810563291]
Collect_MPObjValNHua =   [649.0, 656.1428571428569, 665.0]


 Ops, stop iteration
 Values adopted from the Itr-1' th iteration, and Itr = {2}, judgeCount = {1}

~~~~~~~~~~judgeCount = 1, SPObj_SPF = 5614.054438167743
Vessel i: 0:     pi: 0-5,     ai-di: 9-20,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 9-20,     taoi-deltai: 9-18,     taoPi_SP-deltaPi_SP: 9-18,     betaNi: 9,
    bi: 9
Vessel i: 1:     pi: 0-5,     ai-di: 33-51,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 33-51,     taoi-deltai: 33-49,     taoPi_SP-deltaPi_SP: 33-49,     betaNi:
    16,     bi: 16
Vessel i: 2:     pi: 0-5,     ai-di: 57-67,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 57-67,     taoi-deltai: 57-65,     taoPi_SP-deltaPi_SP: 57-65,     betaNi:
    8,     bi: 8
Vessel i: 3:     pi: 5-10,     ai-di: 15-27,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 15-27,     taoi-deltai: 15-25,     taoPi_SP-deltaPi_SP: 15-25,     betaNi
    : 10,     bi: 10
Vessel i: 4:     pi: 5-10,     ai-di: 42-62,     gi_SP-gpi_SP: 0.000000-0.000000,     ai_SP-di: 42-62,     taoi-deltai: 42-60,     taoPi_SP-deltaPi_SP: 42-56,     betaNi
    : 18,     bi: 18
Vessel i: 5:     pi: 12-18,     ai-di: 17-40,     gi_SP-gpi_SP: 0.000000-0.891036,     ai_SP-di: 17-40,     taoi-deltai: 18-28,     taoPi_SP-deltaPi_SP: 18-28,
    betaNi: 10,     bi: 10
Vessel i: 6:     pi: 10-15,     ai-di: 21-48,     gi_SP-gpi_SP: 1.000000-0.339615,     ai_SP-di: 29-48,     taoi-deltai: 29-42,     taoPi_SP-deltaPi_SP: 29-42,
    betaNi: 13,     bi: 13
Vessel i: 7:     pi: 28-34,     ai-di: 37-57,     gi_SP-gpi_SP: 0.400000-0.769350,     ai_SP-di: 41-57,     taoi-deltai: 40-44,     taoPi_SP-deltaPi_SP: 41-44,
    betaNi: 4,     bi: 4
Vessel i: 8:     pi: 21-26,     ai-di: 8-41,     gi_SP-gpi_SP: 0.600000-1.000000,     ai_SP-di: 12-41,     taoi-deltai: 12-29,     taoPi_SP-deltaPi_SP: 13-29,     betaNi
    : 17,     bi: 17
Vessel i: 9:     pi: 16-21,     ai-di: 25-58,     gi_SP-gpi_SP: 1.000000-0.000000,     ai_SP-di: 31-58,     taoi-deltai: 32-54,     taoPi_SP-deltaPi_SP: 32-54,
    betaNi: 22,     bi: 22

round LB =   [649, 5664, 6279]
round UB =   [10666, 6270, 6270]
round Hua =   [0, 5008, 5614]
round SPObjVal =   [5008, 5614, 5708]
round MPObjValNHua =   [649, 656, 665]

OptimalObj = 6279.054438167743
Time: 583.000000
```