```
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=40948
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
 4
   6
   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
 8
   paper')
10
  Backend TkAgg is interactive backend. Turning interactive mode on.
   Waiting 5s....
12
   Set parameter TimeLimit to value 10800
   Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)
13
15
   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
16
17
   Optimize a model with 906336 rows, 64136 columns and 2693759 nonzeros
19
   Model fingerprint: 0x5bb01e4e
   Variable types: 0 continuous, 64136 integer (54000 binary)
20
21
   Coefficient statistics:
   Matrix range [1e-01, 1e+15]
    Objective range [1e+00, 5e+01]
23
24
    Bounds range [1e+00, 1e+00]
                [1e+00, 2e+15]
    RHS range
26
   Warning: Model contains large matrix coefficient range
27
   Warning: Model contains large rhs
28
       Consider reformulating model or setting NumericFocus parameter
29
       to avoid numerical issues.
30
  Presolve removed 616473 rows and 33592 columns (presolve time = 5s) ...
   Presolve removed 624299 rows and 34274 columns (presolve time = 10s) ...
31
   Presolve removed 776622 rows and 44490 columns (presolve time = 15s) ...
   Presolve removed 780672 rows and 44520 columns
34
   Presolve time: 15.48s
35
   Presolved: 125664 rows, 19616 columns, 457697 nonzeros
   Variable types: 0 continuous, 19616 integer (19280 binary)
37
   Deterministic concurrent LP optimizer: primal and dual simplex (primal and dual model)
38
39
   Showing first log only...
40
41
   Root relaxation presolved: 19604 rows, 145244 columns, 475981 nonzeros
42
43
44
   Root simplex log...
45
46
   Iteration Objective
                      Primal Inf. Dual Inf.
                                          Time
      0 -1.4730000e+04 0.000000e+00 2.412884e+05
47
48
   Concurrent spin time: 0.44s
49
50
   Solved with dual simplex (primal model)
51
52
   Root relaxation: objective 7.069625e+02, 4345 iterations, 2.11 seconds (2.16 work units)
53
54
     Nodes | Current Node | Objective Bounds
55
   Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
56
57
         0 706.96254 0 244
                              - 706.96254
                                          - - 20s
58
         0 714.22331
                    0 815
                              - 714.22331
                                                26s
59
     0
         0 714.22331
                     0 806
                              - 714.22331
                                              - 26s
60
     0
         0 718.02544
                     0 1123
                              - 718.02544
                                                28s
                                                29s
         0 718.02544
                              - 718.02544
61
                     0 1120
                              - 718.93170
62
     0
         0 718.93170
                     0 969
                                                29s
                                              - 30s
63
         0.719.01230
                    0.724
                              - 719 01230
     0
64
     0
         0 719.12066
                    0 724
                              - 719.12066
                                                30s
         0 719.25971
                     0 720
65
                              - 719.25971
                                                30s
         0 719.39706
                    0 722
                              - 719.39706
                                              - 30s
66
     0
                              - 719.52697
67
     0
         0 719.52697
                     0 723
                                                31s
                                                31s
68
     0
         0 719.64744
                     0 721
                              - 719.64744
69
         0 719.75816
                    0.719
                              - 719.75816
                                              - 31s
70
     0
         0 719 82539
                     0 716
                              - 719 82539
                                                31s
71
     0
         0 719.96305
                     0 713
                              - 719.96305
                                                32s
         0 720.02695
                     0 712
                              - 720.02695
                                              - 32s
73
     0
         0 720.08938
                     0 705
                              - 720.08938
                                              - 32s
74
                     0.701
                                              - 32s
     0
         0 720.15052
                              - 720.15052
75
         0 720.24955
                     0 687
                              - 720.24955
                                                32s
     0
76
         0 720.30687
                     0 676
                              - 720.30687
                                                33s
                                              - 33s
         0 720.37298
                              - 720.37298
77
     0
                     0 1220
                                           _
78
     0
         0 720.49671
                     0 1250
                               - 720.49671
                                              - 33s
     0
         0 720.59581
                               - 720.59581
                                              - 33s
79
                     0 1197
```

80 81	vn				
	0	n	720.69426	0 1164	- 720.69426 33s
0.1					
	0		720.75221	0 1160	- 720.75221 34s
82	0	0	720.80077	0 1211	- 720.80077 34s
83	0		720.88187	0 1167	- 720.88187 34s
	_				
84	0		720.93822	0 1215	- 720.93822 34s
85	0	0	720.98105	0 1213	- 720.98105 34s
86	0	0	721.02075	0 1193	- 721.02075 35s
87	0		721.05885	0 1163	- 721.05885 35s
88	0	0	721.11848	0 1131	- 721.11848 35s
89	0		721.17448	0 1107	- 721.17448 35s
	_				
90	0		721.23047	0 1085	- 721.23047 35s
91	0	0	721.28644	0 1059	- 721.28644 35s
92	0		721.35483	0 1116	- 721.35483 36s
93	0		721.43600	0 1085	- 721.43600 36s
94	0	0	721.51587	0 1063	- 721.51587 36s
95	0	0	721.55987	0 889	- 721.55987 36s
	_				
96	0		721.55987	0 882	- 721.55987 36s
97	0	0	723.33333	0 421	- 723.33333 39s
98	0	0	723.33333	0 406	- 723.33333 39s
99	0		723.33333	0 390	=======================================
100	0		723.33333	0 569	- 723.33333 47s
101	0	0	723.33333	0 605	- 723.33333 48s
02	0		723.41126	0 955	- 723.41126 51s
	_				
.03	0		723.41126	0 955	- 723.41126 51s
04	0	0	723.41126	0 855	- 723.41126 52s
05	0		723.41126	0 854	- 723.41126 52s
06	0		723.94801	0 525	- 723.94801 59s
107	0	0	723.94801	0 525	- 723.94801 59s
108	0		723.98340	0 698	- 723.98340 61s
	_				
109	0		723.98340	0 695	- 723.98340 61s
110	0	0	723.98621	0 663	- 723.98621 61s
111	0	0	724.11247	0 846	- 724.11247 61s
112	0		724.41224	0 970	- 724.41224 62s
113	0		724.41431	0 1149	- 724.41431 63s
114	0	0	724.41431	0 1145	- 724.41431 63s
115	0		724.55996	0 1503	- 724.55996 66s
	_				
16	0		724.55996	0 1473	- 724.55996 66s
17	0	0	724.80733	0 1380	- 724.80733 67s
18	0		724.80815	0 1229	- 724.80815 68s
119	0		724.95088	0 1397	- 724.95088 69s
120	0	0	724.95088	0 1382	- 724.95088 70s
121	0	0	724.96200	0 1334	- 724.96200 70s
	_				
122	0		724.96539	0 1398	
123	0	0	724.96539	0 1355	- 724.96539 71s
124	0	0	725.07729	0 1397	- 725.07729 73s
125	0		725.07729	0 1366	
126	0		725.10243	0 1422	- 725.10243 74s
127	0	0	725.10243	0 1422	- 725.10243 74s
128	0		725.10519	0 1419	- 725.10519 74s
	_				
129	0		725.23473	0 1382	- 725.23473 76s
130	0	0	725.27213	0 1462	- 725.27213 77s
131	0		725.27213	0 1471	- 725.27213 77s
132	0		725.27213	0 1421	- 725.27213 78s
133	0	0	725.97576	0 1347	- 725.97576 80s
34	0		726.13523	0 1396	- 726.13523 81s
135	0		726.13523	0 1390	- 726.13523 81s
136	0	0	726.17600	0 1369	- 726.17600 82s
137	0		726.17600	0 1340	- 726.17600 82s
38	_				
	0		726.32622	0 2003	
.39	0	0	726.32622	0 1978	- 726.32622 85s
40	0	0	726.38583	0 1845	- 726.38583 86s
41	0		726.38591	0 1877	- 726.38591 86s
+ 1	_				
	0	()	726.52367	0 1556	- 726.52367 88s
				0 1550	
142	0		726.52367	0 1448	
142 143	_	0	726.52367	0 1448	- 726.52367 88s
42 43 44	0	0	726.52931	0 1448 0 1383	- 726.52367 88s - 726.52931 89s
.42 .43 .44	_	0 0 0	726.52931 726.55173	0 1448	- 726.52367 88s - 726.52931 89s - 726.55173 89s
42 43 44 45	0	0 0 0	726.52931	0 1448 0 1383	- 726.52367 88s - 726.52931 89s
142 143 144 145 146	0 0 0	0 0 0 0	726.52931 726.55173 726.55173	0 1448 0 1383 0 1288 0 1348	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 89s - 726.55173 - 90s
142 143 144 145 146 147	0 0 0 0	0 0 0 0	726.52931 726.55173 726.55173 726.55173	0 1448 0 1383 0 1288 0 1348 0 1309	- 726.52367 88s - 726.52931 89s - 726.55173 89s - 726.55173 90s - 726.55173 90s
142 143 144 145 146 147	0 0 0	0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585	0 1448 0 1383 0 1288 0 1348	- 726.52367 88s - 726.52931 89s - 726.55173 89s - 726.55173 90s - 726.755173 90s - 726.77585 92s
42 43 44 45 46 47 48	0 0 0 0	0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585	0 1448 0 1383 0 1288 0 1348 0 1309	- 726.52367 88s - 726.52931 89s - 726.55173 89s - 726.55173 90s - 726.755173 90s - 726.77585 92s
42 43 44 45 46 47 48 49	0 0 0 0 0	0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s
42 43 44 45 46 47 48 49 50	0 0 0 0 0 0	0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.78211	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.77585 - 92s - 726.77585 - 92s - 726.78211 - 93s
142 143 144 145 146 147 148 149	0 0 0 0 0	0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s
142 143 144 145 146 147 148 149 150	0 0 0 0 0 0	0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.78211	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.77585 - 92s - 726.77585 - 92s - 726.78211 - 93s
142 143 144 145 146 147 148 149 150 151	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.78211 726.79073 726.79983	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.75785 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79073 - 93s - 726.79983 - 94s
142 143 144 145 146 147 148 149 150 151 152	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.78211 726.79073 726.79983 726.79983	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79983 - 94s - 726.79983 - 94s
42 43 44 45 46 47 48 49 50 51 52 53	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.78211 726.79073 726.79983	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.75785 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79073 - 93s - 726.79983 - 94s
142 143 144 145 146 147 148 149 150 151 152 153 154	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.78211 726.79073 726.79983 726.79983	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79983 - 94s - 726.79983 - 94s
142 143 144 145 146 147 148 149 150 151 152 153 154	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.78211 726.79073 726.79983 726.80424 726.80424	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79073 - 93s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s
142 143 144 145 146 147 148 149 150 151 152 153 154 155	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.7983 726.79983 726.79983 726.80424 726.80424 726.80424	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79073 - 93s - 726.79083 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.80424 - 95s - 726.80424 - 95s
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.79211 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.75585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79983 - 94s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.92938 - 97s
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.7983 726.79983 726.79983 726.80424 726.80424 726.80424	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.7585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79073 - 93s - 726.79083 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.80424 - 95s - 726.80424 - 95s
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.77585 726.77585 726.79211 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938 726.92938	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819 0 1818 0 1775 0 1724	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.75173 - 92s - 726.77585 - 92s - 726.77585 - 92s - 726.79073 - 93s - 726.79983 - 94s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.80424 - 95s - 726.80424 - 95s - 726.80424 - 95s - 726.92938 - 97s - 726.92938 - 97s
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.79073 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938 726.92938 726.92938 726.97353	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819 0 1818 0 1775 0 1724 0 1830	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.75173 - 92s - 726.77585 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79973 - 94s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.92938 - 97s - 726.92938 - 97s - 726.92938 - 97s - 726.97353 - 98s
142 143 144 145 146 147 148 149 150 151 151 152 153 154 155 156 157 158 159	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.7983 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938 726.92938 726.97353 726.97353	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1818 0 1775 0 1724 0 1830 0 1813	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.75785 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79973 - 93s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.92938 - 97s - 726.92938 - 97s - 726.97353 - 98s - 726.97353 - 98s - 726.97353 - 98s
42 43 44 45 46 47 48 49 50 151 152 153 154 155 155 157 158 159 160	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.79073 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938 726.92938 726.92938 726.97353	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1819 0 1818 0 1775 0 1724 0 1830	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.75785 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.80424 - 95s - 726.92938 - 97s - 726.92938 - 97s - 726.92938 - 97s - 726.97353 - 98s - 726.97353 - 98s - 726.97353 - 98s - 726.98096 - 99s
142 143 144 145 146 147 148 149 150 151 151 152 153 154 155 156 157	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	726.52931 726.55173 726.55173 726.55173 726.7585 726.77585 726.7983 726.79983 726.79983 726.80424 726.80424 726.80424 726.92938 726.92938 726.97353 726.97353	0 1448 0 1383 0 1288 0 1348 0 1309 0 1707 0 1686 0 1723 0 1765 0 1897 0 1862 0 1794 0 1818 0 1775 0 1724 0 1830 0 1813	- 726.52367 - 88s - 726.52931 - 89s - 726.55173 - 90s - 726.55173 - 90s - 726.55173 - 90s - 726.75785 - 92s - 726.77585 - 92s - 726.78211 - 93s - 726.79973 - 93s - 726.79983 - 94s - 726.80424 - 94s - 726.80424 - 95s - 726.92938 - 97s - 726.92938 - 97s - 726.97353 - 98s - 726.97353 - 98s - 726.97353 - 98s

```
164
          0 727.07008 0 1646
                                  - 727.07008
                                                - - 102s
       0
165
           0 727.11122
                        0.1771
                                   - 727.11122
                                                - - 103s
                        0.1657
                                                - - 103s
166
           0 727.11721
                                   - 727.11721
167
       0
           0 727.11721
                        0 1645
                                   - 727.11721
                                                   - 104s
           0 727.20400 0 1677
                                   - 727.20400
                                                   - 106s
168
                                                - - 107s
169
       0
           0 727.22526 0 1710
                                  - 727.22526
                                  - 727.22526
                                                - - 107s
170
           0 727.22526  0 1616
       0
                                                - - 108s
171
           0 727.22526 0 1599
                                  - 727.22526
                                                - - 110s
172
       0
           0 727.26778
                        0 1359
                                  - 727.26778
                                  - 727.26778
                                                - - 110s
173
           0 727.26778
                       0.1328
       0
                                                - - 111s
- - 112s
                                  - 727.31128
174
       0
           0.727.31128 0.1535
175
       0
           0 727.31128
                        0 1579
                                  - 727.31128
                                                - - 112s
176
           0 727.31128 0 1563
                                  - 727.31128
                                                - - 114s
177
           0.727.39825
                        0.1584
                                  - 727.39825
       0
                                               - - 114s
- - 114s
178
       0
           0 727.39825
                        0 1546
                                  - 727.39825
           0 727.39825
                                  - 727.39825
179
                       0 1509
180
       0
           0 727.49354 0 1113
                                  - 727.49354
                                                - - 116s
                                                - - 116s
                                  - 727.49354
           0 727.49354 0 1057
181
       0
                                                - - 117s
182
           0 727.49636 0 1086
                                  - 727.49636
                                                - - 119s
183
       0
           0 727.55087
                        0 1307
                                  - 727.55087
                                                - - 119s
           0.727.55087
                        0.1290
                                  - 727.55087
184
       0
                                               - - 120s
- - 122s
           0 727.55087 0 1330
                                  - 727.55087
185
       0
186
       0
           0 727.62378
                                  - 727.62378
                        0 1515
                                                - - 122s
187
       0
           0 727.62672
                        0 1524
                                  - 727.62672
                                                - - 124s
                                  - 727.67432
188
           0 727.67432
                       0.1458
       0
                                                - - 125s
189
       0
           0 727.67756
                       0 1578
                                  - 727.67756
                                  - 727.67756
                                                - - 125s
190
           0 727.67756 0 1575
191
           0 727.79654 0 1308
                                  - 727.79654
                                                - - 127s
       0
                                                - - 127s
- - 128s
                                  - 727.79654
192
       0
           0 727.79654
                        0.1282
193
           0 727.79654 0 1290
                                  - 727.79654
                                               - - 128s
- - 130s
194
       0
           0 727.79654
                       0 1281
                                  - 727.79654
195
                                  - 727.89723
       0
           0 727.89723 0 1251
                                                - - 130s
196
       0
           0 727.89723 0 1271
                                  - 727.89723
197
           0 727.90223
                                  - 727.90223
                                                - - 131s
       0
                        0 1118
198
       0
           0 727.90223 0 1312
                                  - 727.90223
                                               - - 131s
                                                - - 133s
199
                                  - 728.01579
           0 728.01579 0 1049
       0
                                                - - 134s
200
       0
           0 728.01579
                      0 1144
                                  - 728.01579
                                               - - 134s
201
           0 728.01579 0 1109
                                  - 728.01579
                                  - 728.06016
                                               - - 135s
202
       0
           0 728.06016 0 991
203
       0
           0 728.07039 0 1403
                                  - 728.07039
                                               - - 136s
                                                - - 137s
204
           0 728.07039 0 1385
                                  - 728.07039
                                               - - 137s
- - 139s
205
       0
           0 728.07039
                       0 1376
                                  - 728.07039
                                  - 728.12250
206
           0.728 12250 0.1209
       0
                                                - - 139s
207
       0
           0 728.12250 0 1214
                                  - 728.12250
                                                - - 139s
208
                                  - 728.12250
       0
           0 728.12250 0 1349
                                  - 728.12250
                                                - - 140s
209
       0
           0 728.12250 0 1312
                                                - - 142s
210
       0
           0 728.22837 0 1325
                                  - 728.22837
                                                - - 142s
- - 143s
211
       0
           0 728.22837
                        0 1265
                                  - 728.22837
212
           0 728.22839 0 1479
                                  - 728.22839
                                                - - 143s
           0 728.22839 0 1447
                                  - 728.22839
213
       0
                                                - - 145s
214
       0
           0 728.28269 0 1075
                                  - 728.28269
215
                                  - 728.28269
                                                - - 145s
           0 728.28269 0 1053
                                               - - 146s
- - 146s
- - 148s
           0 728.28269 0 1130
                                  - 728.28269
216
       0
                                  - 728.28269
217
       0
           0 728.28269 0 1126
218
           0 728.42308 0 1000
                                  - 728.42308
                                                - - 149s
219
       0
           0 728.42308
                        0.1038
                                  - 728.42308
                                               - - 149s
                                  - 728.42308
220
       0
           0 728.42308 0 1030
                                               - - 151s
221
           0 728.54631
                        0 507
                                  - 728.54631
222
       0
           0 728.54954
                        0 1271
                                  - 728.54954
                                                - - 153s
                                               - - 154s
223
           0 728.54954 0 1217
                                  - 728.54954
       0
                                               - - 157s
224
           0.728.57419 0.752
                                  - 728.57419
       0
225
       0
           0 728.57419 0 737
                                  - 728.57419
                                               - - 157s
226
                                               - - 160s
           0 728.57419 0 208
                                  - 728.57419
227
       0
           2 728.57419 0 208
                                  - 728.57419
                                               - - 168s
228
                                               - 1961 170s
       1
           4 728.75912 1 221
                                  - 728,75912
                                   - 728.96541 - 758 175s
- 728.96541 - 574 180s
- 728.96541 - 522 185s
229
           30 741.86051 6 541
                                  - 728.96541
      28
230
      59
           60 743.79473 11 589
           99 744.15705 20 518
231
      94
232
      141 154 748.55146 30 580
                                    - 728.96541 - 412 190s
233
           205 754.42233 38 489
                                    - 728.96541
                                                  - 336 195s
      198
234
                                  - 730.00000 - 300 201s
      284 276 infeasible 57
      337 322 752.69823 12 285
235
                                   - 730.00000 - 309 205s
236
      390
          357 780.82719 20 675
                                    - 730.00000
                                                  - 323 210s
237
                                    - 730.00000
                                                  - 343 217s
      466 421 842.24253 29 388
238
    * 517 400
                     120 1042.0000000 730.00000 29.9% 319 217s
239 H 522
           392
                         1010.0000000 730.00000 27.7% 318 219s
240 H 529 285
                          890.0000000 730.00000 18.0% 320 219s
241
      541 294 845.93896 35 259 890.00000 730.00000 18.0% 325 220s
      590 305 840.00000 9 373 890.00000 730.00000 18.0% 323 229s
242
243
      598
          316 840.00000 10 586 890.00000 730.00000 18.0% 341 231s
           356 853.33333 12 435 890.00000 730.00000 18.0% 355 238s
244
      631
          363 859.39762 14 663 890.00000 730.00000 18.0% 346 240s
245
      672
          381 730.00000 6 575 890.00000 730.00000 18.0% 347 247s
246
      727
247
      738
          393 733.33333 7 481 890.00000 730.00000 18.0% 353 250s
```

```
248
      779 412 746.29681 11 691 890.00000 730.00000 18.0%
                                                                365 258s
249
      802 418 740.25582 11 759 890.00000 730.00000 18.0%
                                                               366 262s
      812 431 740.27458 13 922 890.00000 730.00000 18.0%
250
                                                                388 266s
251
      830
           452 740.80111 14 900 890.00000 730.00000 18.0%
                                                               400 270s
252
                          14 1025 890.00000 730.00000 18.0%
      858 486 740.27458
253
     H 883 343
                           810.0000000 730.00000 9.88% 405 276s
254
      896 314 742.04063 17 592 810.00000 730.00000 9.88%
                                                               404 282s
255
      915 \ \ 330 \ \ 780.00000 \ \ 19 \ \ 350 \ \ 810.00000 \ \ 730.00000 \ \ 9.88\% \ \ \ 419 \ \ 288s
256
      937
                750.00000
                           28 302 810.00000 730.00000 9.88%
                                                               431
257
      950
           348 751.56863 30 392 810.00000 730.00000 9.88% 447
                                                                    300s
258
      980 379 760.00000 33 272 810.00000 730.00000 9.88% 457 305s
259
      1019
                763.33333 40 359 810.00000 730.00000 9.88%
           413
                                                                470 310s
260
      1070 414 797.00000 107 208 810.00000 730.00000 9.88% 478 355s
      1072 415 797.00000 84 99 810.00000 730.00000 9.88% 477 362s
261
262
      1073
            416
                744.24866 14 357 810.00000 734.82634 9.28%
                                                                477 370s
263
      1075
           417 795.00000 29 548 810.00000 736.66667 9.05%
      1076 418 752.97853
                           29 566 810.00000 736.99852 9.01%
264
                                                                476 382s
265
      1077
           419 768 63704
                           36 220 810.00000 739.84688 8.66%
                                                                475 3949
266
      1078 419 790.00000 72 693 810.00000 739.84688 8.66% 475 396s
267
      1080
            421
                741.86274
                            7 602 810.00000 740.00000 8.64% 474 400s
                790,00000 51 254 810,00000 743,30407 8,23% 473 411s
268
      1081 421
                                                                473 415s
269
      1083 423 773.33333 21 582 810.00000 744.10985 8.13%
270
                           12 864 810.00000 744.75981 8.05%
      1085
            424
                752.92322
                                                                472 420s
271
      1086 425
                799.73509 44 974 810.00000 744.76156 8.05%
                                                                471 425s
272
      1087 425 794.53649 69 445 810.00000 744.83267 8.05%
                                                                471 432s
273
      1090 427
                758.00000 29 772 810.00000 745.03703 8.02%
                                                                469 436s
274
      1093 429 756.66667 31 750 810.00000 745.13644 8.01%
                                                                468 440s
      1094 430 758.40000 13 580 810.00000 745.17661 8.00%
275
                                                                468 448s
276
      1096 431 790,00000
                           71 808 810.00000 745.20177 8.00%
                                                                467 453s
277
      1097 432 752.38806 32 361 810.00000 745.22030 8.00%
                                                                466 459s
278
      1098 433 745.22030 11 473 810.00000 745.22030 8.00%
                                                                466 463s
279
      1099 433 770.00000 45 394 810.00000 745.22030 8.00% 466 468s
280 H 1099 410
                            770.0000000 745.22030 3.22% 466 469s
      1101 412 770.00000 32 547 770.00000 745.24858 3.21%
                                                                465 471s
282
      1102 412 759.17897 35 403 770.00000 745.51155 3.18% 464 477s
                            750.0000000 745.51155 0.60% 464 478s
283 H 1102 391
284
285
    Cutting planes:
286
      Learned: 6
287
      Gomory: 14
288
      Cover: 60
289
      Implied bound: 19
290
      Clique: 112
291
      MIR: 27
292
      StrongCG: 20
293
      Flow cover: 100
294
      GUB cover: 62
295
      Zero half: 47
296
      RLT: 88
297
      Relax-and-lift: 32
298
      BQP: 26
299
300 Explored 1102 nodes (744026 simplex iterations) in 480.06 seconds (951.31 work units)
301
    Thread count was 8 (of 8 available processors)
302
303
    Solution count 6: 750 770 810 ... 1042
304
305
    Optimal solution found (tolerance 1.00e-04)
     Best objective 7.500000000000e+02, best bound 7.50000000000e+02, gap 0.0000%
307
    Optimal Obi: 750.0
308 \text{ Obj} = 750.0
309
     Solutions
310
     Vessel i: 0:
                  li: 7,
                          pi: 7-14,
                                    ai-di: 3-34,
                                                  taoi-deltai: 3-32,
                                                                    periodi: 29,
                                                                                  taoPi SP-deltaPi SP: 3-11, periodPi: 8,
                                                                                                                           betaNi: 17,
                                                                                                                                         bi: 29.
                                                                                                                                                 Txijt:
           o1i: 203, o2i: 160, o3i: -567, o4i: 340, Ti: 136
     203.
     Vessel i: 1:
                  li: 5,
                          pi: 15-20,
                                      ai-di: 12-22,
                                                    taoi-deltai: 12-20,
                                                                        periodi: 8,
                                                                                     taoPi_SP-deltaPi_SP: 12-15,
                                                                                                                 periodPi: 3,
                                                                                                                               betaNi: 4,
                                                                                                                                           bi: 8,
                                                                                                                                                  Txijt
           o1i: 40, o2i: 60, o3i: -125, o4i: 80,
                                                    Ti: 55
     Vessel i: 2:
                 li: 5,
                          pi: 20-25,
                                     ai-di: 27-35,
                                                    taoi-deltai: 27-33,
                                                                                    taoPi SP-deltaPi SP: 27-29,
                                                                                                                 periodPi: 2,
                                                                        periodi: 6.
                                                                                                                               betaNi: 4.
                                                                                                                                           bi: 6.
                                                                                                                                                  Txiit
           o1i: 30, o2i: 40, o3i: -100, o4i: 80.
                                                    Ti: 50
     • 30
                         pi: 27-34,
313
     Vessel i: 3:
                  li: 7,
                                      ai-di: 24-60,
                                                    taoi-deltai: 24-58,
                                                                        periodi: 34,
                                                                                     taoPi SP-deltaPi SP: 24-33,
                                                                                                                   periodPi: 9,
                                                                                                                                betaNi: 20,
                                                                                                                                             bi: 34,
                 o1i: 238, o2i: 180,
     Txijt: 238,
                                      o3i: -675,
                                                  o4i: 400, Ti: 143
                                      ai-di: 35-41,
                         pi: 21-26,
                                                    taoi-deltai: 35-39.
                                                                        periodi: 4.
                                                                                    taoPi_SP-deltaPi_SP: 35-37,
                                                                                                                 periodPi: 2.
                                                                                                                               betaNi: 2.
                                                                                                                                           bi: 4. Txiit
     Vessel i: 4:
                 li: 5,
     20.
           o1i: 20, o2i: 40, o3i: -50,
                                         o4i: 40.
                                                   Ti: 50
                          pi: 14-20,
                                                    taoi-deltai: 31-46,
     Vessel i: 5:
                 li: 6,
                                      ai-di: 31-60,
                                                                                     taoPi_SP-deltaPi_SP: 31-36,
                                                                                                                                betaNi: 9,
                                                                                                                                            bi: 15,
                                                                        periodi: 15,
                                                                                                                   periodPi: 5,
     Txijt: 90, o1i: 90,
                          o2i: 100,
                                    o3i: -260, o4i: 180,
                                                          Ti: 110
                          pi: 8-14,
                                     ai-di: 40-80,
                                                                                    taoPi SP-deltaPi SP: 40-46,
     Vessel i: 6:
                                                   taoi-deltai: 40-64
                                                                       periodi: 24.
                                                                                                                 periodPi: 6.
                                                                                                                               betaNi: 15.
                                                                                                                                            hi: 24
                 1i· 6
     Txijt: 144,
                 o1i: 144, o2i: 120, o3i: -468,
                                                  o4i: 300,
                                                            Ti: 96
     Vessel i: 7:
                  li: 6,
                         pi: 20-26,
                                      ai-di: 43-72,
                                                    taoi-deltai: 43-56,
                                                                        periodi: 13,
                                                                                     taoPi_SP-deltaPi_SP: 43-48,
                                                                                                                  periodPi: 5,
                                                                                                                                betaNi: 7,
                                                                                                                                            bi: 13,
     Txiit: 78.
               o1i: 78,
                          o2i: 100,
                                    o3i: -208, o4i: 140, Ti: 110
318
    TimeSolveModel: 500.000000
319
320
321
322
    TimeAll: 504.000000
323
```

unknown			
324 325 326			
326			