```
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=4195
   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 3600
   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 609565 rows, 47910 columns and 1804024 nonzeros
19
   Model fingerprint: 0xbfa0dda3
   Variable types: 0 continuous, 47910 integer (40308 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 367123 rows and 21959 columns (presolve time = 5s) ...
   Presolve removed 383686 rows and 22974 columns (presolve time = 10s) ...
31
   Presolve removed 383686 rows and 22974 columns (presolve time = 15s) ...
   Presolve removed 383686 rows and 22974 columns (presolve time = 20s) ...
   Presolve removed 503997 rows and 31503 columns
34
35
   Presolve time: 24.76s
   Presolved: 105568 rows, 16407 columns, 377273 nonzeros
   Variable types: 0 continuous, 16407 integer (16130 binary)
37
38
39
   Deterministic concurrent LP optimizer: primal and dual simplex (primal and dual model)
40
   Showing first log only...
41
   Root relaxation presolved: 16397 rows, 121945 columns, 392819 nonzeros
42
43
44
45
   Root simplex log...
46
47
   Iteration Objective
                      Primal Inf. Dual Inf.
      0 -1.2521000e+04 0.000000e+00 1.619372e+05
48
49
   Concurrent spin time: 0.01s
50
51
   Solved with dual simplex (primal model)
52
53
   Root relaxation: objective 6.539570e+02, 2976 iterations, 1.73 seconds (1.02 work units)
54
   Total elapsed time = 30.14s
55
                             Objective Bounds
56
     Nodes | Current Node |
                                                 Work
57
    Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
59
         0 653.95696 0 461
                              - 653.95696
                                              - 32s
60
     0
         0 665,90255 0 560
                              - 665.90255
                                              - 38s
         0 665.90255
                     0 544
                              - 665.90255
61
                                              - 38s
62
     0
         0 669.75037
                     0 1008
                               - 669.75037
                                                 40s
                                              - 41s
63
         0.669 79621
                     0.1008
                               - 669 79621
     0
                                              - 41s
64
     0
         0 669.84423
                     0.981
                              - 669.84423
         0 669.90482
                     0 978
                              - 669.90482
65
     0
                                              - 41s
         0 669.97499
                     0 971
                              - 669.97499
66
     0
                                              - 42s
         0 670.05252
67
     0
                     0.958
                              - 670.05252
                                              - 42s
68
     0
         0 670.10522
                     0 940
                              - 670.10522
                                              - 42s
69
         0 670.15672
                     0 934
                              - 670.15672
                                              - 43s
70
                     0.925
                                              - 43s
     0
         0.670.20100
                              - 670 20100
71
     0
         0 670.25251
                     0 916
                              - 670.25251
                                              - 43s
         0 670.30086
                     0 902
                              - 670.30086
                                              - 44s
73
     0
         0 670.35252
                     0 922
                              - 670.35252
                                              - 44s
74
                                              - 45s
     0
         0 670.35252
                     0 878
                              - 670.35252
75
         0 672.77458
                     0 577
                              - 672.77458
                                              - 48s
76
         0 672.77458
                     0 575
                              - 672.77458
                                              - 49s
                                              - 51s
         0 674.28297
                               - 674.28297
77
     0
                     0 1243
                                           _
78
     0
         0 678.17136
                     0 1222
                               - 678,17136
                                              - 52s
     0
         0 679.16963
                              - 679.16963
79
                     0 603
                                                53s
```

unk	KIIOW.							
80	80	0	0.67	9.17369	0 603	- 679.17369	_	- 538
8		ő		9.18628	0 788	- 679.18628		- 549
							-	
82		0		9.30891	0 944	- 679.30891	-	- 548
83		0		9.32367	0 962	- 679.32367	-	- 54s
84	84	0	0 67	9.32432	0 970	- 679.32432	-	- 548
	85	0		3.35873	0 1060	- 683.35873	-	- 58
	86	0		3.35873	0 1041	- 683.35873		- 58
		-						
	87	0		4.34254	0 1688	- 684.34254	-	- 60
88	88	0		6.87063	0 1545	- 686.87063	-	- 61
89	89	0	0 68	8.31218	0 1446	- 688.31218	-	- 63
	90	0		9.01362	0 1485	- 689.01362	_	
9:		0		9.22753	0 1439	- 689.22753	_	- 65
	92	0		9.43042	0 1464	- 689.43042	-	- 65
93		0		9.68507	0 1792	- 689.68507	-	- 66
94	94	0	0 68	9.88491	0 1833	- 689.88491	-	- 66
	95	0		0.08393	0 1872	- 690.08393	_	- 67
		_						
	96	0		0.28248	0 1906	- 690.28248	-	- 67
	97	0		0.48099	0 1939	- 690.48099	-	- 67
99	98	0	0 69	0.52290	0 2043	- 690.52290	-	- 67
	99	0		0.64687	0 2067	- 690.64687	_	- 68
100		0		0.88039	0 2089	- 690.88039	-	- 68
10		0		0.91484	0 2082	- 690.91484	-	- 69
102	02	0	0 69	1.14084	0 2039	- 691.14084	-	- 69
103		0		1.40308	0 2330	- 691.40308	_	- 69
104		0		1.62402	0 2253	- 691.62402	_	- 69
103		0		1.82550	0 2253	- 691.82550		- 70
106		0		2.02815	0 2253	- 692.02815	-	- 70
101	07	0	0 69	2.02815	0 2252	- 692.02815	-	- 70
108		0		7.54010	0 1313	- 697.54010	_	- 75
		0		9.86134				
109		_			0 1804	- 699.86134	-	
110		0		1.37809	0 1820	- 701.37809		- 78
110	11	0	0 70	1.86073	0 1788	- 701.86073	-	- 78
112	12	0	0 70	2.51105	0 2133	- 702.51105	-	- 79
113		0		2.94875	0 2123	- 702.94875	-	- 80
114		0		3.40595	0 2099	- 703.40595		- 81
113		0		3.98273	0 2191	- 703.98273	-	- 82
116		0		4.12701	0 2219	- 704.12701		- 83
117	17	0	0 70	4.26998	0 2095	- 704.26998	-	- 83
118	18	0	0 70	4.40916	0 1383	- 704.40916	-	- 84
119		0		4.67446	0 1938	- 704.67446	_	- 84
		0				- 704.75050		
120				4.75050	0 1359			- 85
12		0		4.95531	0 1943	- 704.95531	-	- 85
122	22	0	0 70	5.18692	0 1936	- 705.18692	-	- 86
123	23	0	0 70	5.43699	0 1897	- 705.43699	-	- 86
124		ő		5.43699	0 1935	- 705.43699	_	- 87
		_					-	
125		0		6.25422	0 1722	- 706.25422	-	- 90
120		0		6.25776	0 1692	- 706.25776	-	- 92
127	27	0		6.89064	0 1785	- 706.89064	-	- 96
128	28	0	0 70	6.89064	0 1771	- 706.89064	-	- 96
129		0		6.91850	0 1687	- 706.91850	_	- 96
							-	
130		0		6.93748	0 1812	- 706.93748	-	- 97
13		0		6.93748	0 1820	- 706.93748	-	- 98
132	32	0	0 70	6.93748	0 1817	- 706.93748	-	- 98
133		0		7.46207	0 1910	- 707.46207	_	- 102
134		Ö		7.51170	0 1782	- 707.51170	_	- 103
13:		0		7.54222	0 1810	- 707.54222	-	- 103
136	36	0	0 70	7.72209	0 1824	- 707.72209	-	- 104
131	37	0		7.72209	0 1808	- 707.72209	-	- 104
138		0		7.72529	0 1818	- 707.72529	_	- 105
139		0		8.50651	0 1196	- 708.50651	-	- 107
140		0		8.85499	0 1139	- 708.85499	-	- 108
143	41	0	0 70	8.85499	0 1132	- 708.85499	-	- 108
142		0		9.02862	0 1231	- 709.02862	_	- 109
143		Ö		9.07173	0 1198	- 709.07173	_	- 109
144		0		9.09087	0 1214	- 709.09087	-	- 110
145		0		9.09087	0 1247	- 709.09087	-	- 110
146	46	0	0 70	9.19558	0 1228	- 709.19558	-	- 113
143		0		9.19558	0 1225	- 709.19558	_	- 113
148		ő		9.19992	0 1245	- 709.19992	_	- 114
							-	
149		0		9.58991	0 1203	- 709.58991	-	- 118
150	50	0	0 70	9.79640	0 1212	- 709.79640	-	- 119
15	51	0	0 70	9.79640	0 1210	- 709.79640	-	- 119
152		0		9.80296	0 1266	- 709.80296	_	- 119
153		0		9.80296	0 1263	- 709.80296	-	- 120
154	54	0	0 70	9.91752	0 1177	- 709.91752	-	- 122
155	55	0	0 70	9.91752	0 1187	- 709.91752	-	- 122
150		0		9.94147	0 1194	- 709.94147	_	- 123
		_						
151		0		9.94543	0 1189	- 709.94543	-	- 124
158	58	0	0 71	0.72830	0 1097	- 710.72830	-	- 123
159		0		0.72830	0 1092	- 710.72830	_	- 127
							-	
160		0		0.81305	0 956	- 710.81305	-	- 128
	51	0	0 71	0.81305	0 1031	- 710.81305	-	- 129
16	52	0	0 71	1.13498	0 1005	- 711.13498	-	- 132
162 162		0		1.21539	0 1015	- 711.21539	_	- 133
		0	0 / 1	1.41333	0 1015			10.

```
164
          0 711.21674 0 966
                                 - 711.21674
                                                  - 133s
       0
165
          0 711.85815 0 1083
                                  - 711.85815
                                              - - 136s
          0.712.02781
                       0.1069
                                  - 712.02781
                                                  - 137s
166
167
       0
          0 712.03601
                       0.1009
                                  - 712.03601
                                                   - 138s
          0 712.17791 0 1079
                                  - 712.17791
                                                  - 141s
168
169
       0
          0 712.34368 0 1164
                                  - 712.34368
                                               - - 142s
          0 712.39260 0 1099
                                 - 712.39260
                                               - - 143s
170
       0
                                               - - 143s
171
          0\ 712.39823\quad 0\ 1089
                                 - 712.39823
                                  - 712.75955
172
          0 712.75955
                       0 1044
                                                  - 146s
          0 712.76919 0 1141
                                 - 712.76919
                                               - - 147s
173
       0
                                               - - 148s
- - 152s
                                  - 712.76919
          0.712.76919 0.1108
174
       0
175
       0
          0 712.83623 0 1185
                                 - 712.83623
                                              - - 152s
176
          0 712.83623 0 1184
                                 - 712.83623
                                               - - 153s
177
          0 712.85540 0 1185
                                 - 712.85540
       0
                                              - - 153s
- - 155s
178
       0
          0\ 712.86111 \ 0\ 1077
                                  - 712.86111
                                 - 712.93501
179
          0 712.93501 0 1096
180
          0 712.93501 0 1086
                                 - 712.93501
                                              - - 156s
       0
                                              - - 158s
          0.712.93501 0.724
                                 - 712.93501
181
       0
182
          2 712.93501 0 687
                                 - 712.93501
                                              - - 173s
       0
183
      19
          24 828.54796 4 342
                                  - 718.49702
                                              - 245 175s
                                  - 718.86711 - 113 180s
- 718.86711 - 109 185s
      120 140 729.00000 29 114
184
185
      249 247 739.00000 59 38
                    41 739.0000000 718.86711 2.72% 111 185s
186
      260
      308 220 735.99420 10 282 739.00000 719.00000 2.71% 148 191s
187
      338 213 722.48148 14 223 739.00000 719.00000 2.71% 173 195s
188
189
      353 213 722.33333 9 228 739.00000 719.00000 2.71% 219 201s
      378 201 cutoff 11 739.00000 719.00000 2.71% 260 205s
190
191
          191 723.67852 12 467 739.00000 719.00000 2.71% 284 211s
      400
           79 724.14286 14 724 739.00000 719.00000 2.71% 295 285s
192
      430
193
           80 721.71102 14 160 739.00000 719.00000 2.71% 294 293s
      432
194
      433
           81 725.61136 5 171 739.00000 719.00000 2.71% 293 299s
195
           82 729.00000 40 193 739.00000 719.00000 2.71% 292 301s
      434
196
      437
           85 729.00000 30 724 739.00000 719.00000 2.71% 338 336s
           86 723.94264 14 77 739.00000 719.00000 2.71% 336 344s
197
      439
198
      440
           87 731.06770 11 120 739.00000 719.00000 2.71% 335 353s
199
           88 728.84876 9 179 739.00000 719.00000 2.71% 335 355s
      441
200
      443
           89 725.13513 4 296 739.00000 719.00000 2.71% 333 360s
           90 727.12200 6 28 739.00000 719.00000 2.71% 332 370s
201
      444
           91 719.73073 10 84 739.00000 719.00000 2.71% 331 375s
202
      446
           92 729.00000 41 37 739.00000 719.43852 2.65% 329 381s
203
      448
204
           95 727.45050 5 333 739.00000 719.45737 2.64% 326 387s
205
      453
           96 725.69632 16 99 739.00000 719.63795 2.62% 326 392s
           96 724.00000 25 295 739.00000 719.63795 2.62% 325 396s
206
      454
207
      455
           97 729.00000 23 132 739.00000 719.63795 2.62% 324 402s
           98 719.86916 11 267 739.00000 719.63795 2.62% 324 407s
208
      456
           98 724.00000 19 200 739.00000 719.70774 2.61% 323 414s
209
      457
           99 724.00000 21 338 739.00000 720.42550 2.51% 322 415s
210
      458
211
      460
          100 734.00000 16 115 739.00000 722.95776 2.17% 321 427s
          101 724.20833 11 283 739.00000 724.20833 2.00% 320 430s
212
      461
          102 725.66667 18 170 739.00000 725.66667 1.80% 319 437s
213
      462
214
      463
          102 729.00000 24 206 739.00000 729.00000 1.35% 319 443s
          103 729.00000 5 172 739.00000 729.00000 1.35% 318 450s
          107 729.00000 24 27 739.00000 729.00000 1.35% 397 455s
216
      467
          116 729.00000 29 9 739.00000 729.00000 1.35% 388 460s
217
      498
218
      546 120 732.33333 33 48 739.00000 729.00000 1.35% 358 465s
219
      598
          128 732.33333 39 137 739.00000 729.00000 1.35% 331 470s
      710 120 729.00000 44 12 739.00000 729.00000 1.35% 285 475s
220
221
      807 125 729.00000 52 10 739.00000 729.00000 1.35% 251 480s
222
      979
                cutoff 47 739.00000 729.00000 1.35% 209 485s
     1116 209 729.00000 43 2 739.00000 729.00000 1.35% 186 491s
     1142 210 729.00000 47 8 739.00000 729.00000 1.35% 185 495s
224
225
     1230
           231 729.00000 49 227 739.00000 729.00000 1.35% 178 501s
226
     1330 292 729.00000 41 2 739.00000 729.00000 1.35% 168 506s
227
     1411 318 729.00000 34 81 739.00000 729.00000 1.35% 161 510s
228
           367 737.33333 40 32 739.00000 729.00000 1.35% 150 517s
     1531
229
     1583 396 729.00000 45 61 739.00000 729.00000 1.35% 147 520s
230
     1848
           494 729.00000 55 2 739.00000 729.00000 1.35% 128 525s
     2127 625 729.00000 40 220 739.00000 729.00000 1.35% 114 532s
231
232
     2255 663 729,00000 62 40 739,00000 729,00000 1,35% 108 535s
233
               cutoff 44 739.00000 729.00000 1.35% 100 540s
     2483
234
                             739.00000 729.00000 1.35% 94.3 552s
     2862 886 infeasible 30
235
     3404 1058 732.33333 36 90 739.00000 729.00000 1.35% 84.4 563s
236
     4220 899
                cutoff 41 739.00000 729.00000 1.35% 72.8 570s
     4381 801 729.00000 39 2 739.00000 729.00000 1.35% 82.6 585s
237
238
     4780 569 729.00000 45 4 739.00000 729.00000 1.35% 76.9 595s
239
     5372 323 cutoff 44 739.00000 729.00000 1.35% 70.9 607s
240
     5954 53 infeasible 38 739.00000 732.33333 0.90% 66.7 613s
241
242 Cutting planes:
243
     Learned: 1
244
     Gomory: 21
245
     Cover: 35
246
     Implied bound: 7
     Projected implied bound: 1
247
```

```
unknown
248
       Clique: 20
249
       MIR: 12
       StrongCG: 5
250
251
      Flow cover: 37
252
       GUB cover: 22
253
       Inf proof: 1
254
      Zero half: 18
255
      RLT: 14
256
       Relax-and-lift: 13
257
258 Explored 6277 nodes (476677 simplex iterations) in 614.65 seconds (516.37 work units)
259 Thread count was 8 (of 8 available processors)
260
261 Solution count 2: 739 739
262
263 Optimal solution found (tolerance 1.00e-04)
264 Best objective 7.390000000000e+02, best bound 7.39000000000e+02, gap 0.0000%
265 Optimal Obj: 739.0
266 \text{ Obj} = 739.0
267
     Solutions
                                      ai-di: 3-37,
268 Vessel i: 0:
                                                                        periodi: 32, taoPi_SP-deltaPi_SP: 3-11, periodPi: 8,
                                                                                                                                  betaNi: 19, bi: 32, Txijt:
                   li: 6,
                            pi: 8-14,
                                                    taoi-deltai: 3-35,
            o1i: 192, o2i: 160, o3i: -624, o4i: 380, Ti: 108
     192,
     Vessel i: 1: li: 7,
                           pi: 27-34,
                                       ai-di: 17-33,
                                                                                          taoPi_SP-deltaPi_SP: 17-22,
                                                                                                                         periodPi: 5,
                                                                                                                                       betaNi: 8,
                                                                                                                                                    bi: 14,
                                                        taoi-deltai: 17-31,
                                                                            periodi: 14,
     Txijt: 98, o1i: 98, o2i: 100, o3i: -243, o4i: 160, Ti: 115
                                        ai-di: 23-49,
270 Vessel i: 2:
                           pi: 15-21,
                                                      taoi-deltai: 23-47,
                                                                                          taoPi_SP-deltaPi_SP: 23-29,
                                                                                                                         periodPi: 6,
                                                                                                                                       betaNi: 14,
                  li: 6,
                                                                            periodi: 24,
                                                                                                                                                     bi: 24,
      Txijt: 144,
                   o1i: 144, o2i: 120, o3i: -468, o4i: 280,
                                                                Ti: 76
                          pi: 28-34, ai-di: 41-57,
                                                                                          taoPi SP-deltaPi SP: 41-48,
     Vessel i: 3:
                  li: 6,
                                                      taoi-deltai: 41-55,
                                                                            periodi: 14,
                                                                                                                         periodPi: 7,
                                                                                                                                        betaNi: 7,
                                                                                                                                                    bi: 14,
      Txijt: 84, o1i: 84, o2i: 140, o3i: -182, o4i: 140, Ti: 182
                                         ai-di: 50-74, taoi-deltai: 50-72,
                                                                                          taoPi_SP-deltaPi_SP: 50-56,
     Vessel i: 4:
                  li: 6,
                           pi: 15-21,
                                                                            periodi: 22,
                                                                                                                         periodPi: 6,
                                                                                                                                       betaNi: 13,
                                                                                                                                                     bi: 22,
                   o1i: 132, o2i: 120, o3i: -416, o4i: 260, Ti: 96
     Txijt: 132,
                  li: 7, pi: 7-14, ai-di: 51-75, o1i: 194, o2i: 120, o3i: -432,
     Vessel i: 5:
                                                     taoi-deltai: 53-75,
                                                                           periodi: 22,
                                                                                         taoPi SP-deltaPi SP: 53-59,
                                                                                                                        periodPi: 6,
                                                                                                                                      betaNi: 14,
                                                                                                                                                    bi: 22,
     Txijt: 154,
                                                     o4i: 280, Ti: 162
     TimeSolveModel: 659.000000
274
275
276
277
278 TimeAll: 664.000000
279
280
281
282
```