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80 Bounds range [1e+00, 8e+01]
81 RHS range [8e-01, 1e+10]
82 Warning: Model contains large matrix coefficients
83 Warning: Model contains large rhs
84 Consider reformulating model or setting NumericFocus parameter
85 to avoid numerical issues.
86 Presolve removed 1151547 rows and 900977 columns
87 Presolve time: 2.45s
88 Presolved: 2395 rows, 836 columns, 6371 nonzeros
89 Variable types: 3 continuous, 833 integer (499 binary)
90 Found heuristic solution: objective 3476.6666667
91
92 Root relaxation: objective 4.538684e+03, 706 iterations, 0.01 seconds (0.01 work units)
93
94 Nodes | Current Node | Objective Bounds | Work
95 Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
96
97 0 0 4538.68421 0 65 3476.66667 4538.68421 30.5% - 3s
98 H 0 0 4450.6666667 4538.68421 1.98% - 3s
99 H 0 0 4470.6666667 4538.68421 1.52% - 3s
100 H 0 0 4498.6666667 4528.00000 0.65% - 3s
101 0 0 4528.00000 0 4 4498.66667 4528.00000 0.65% - 3s
102 H 0 0 4528.0000000 4528.00000 0.00% - 3s
103 0 0 4528.00000 0 4 4528.00000 4528.00000 0.00% - 3s
104
105 Cutting planes:
106 Learned: 4
107 Gomory: 8
108 Cover: 15
109 Implied bound: 14
110 Clique: 2
111 MIR: 5
112 StrongCG: 3
113 Flow cover: 4
114 Zero half: 1
115 RLT: 5
116 Relax-and-lift: 2
117 PSD: 11
118
119 Explored 1 nodes (1155 simplex iterations) in 3.25 seconds (3.38 work units)
120 Thread count was 8 (of 8 available processors)
121
122 Solution count 5: 4528 4498.67 4470.67 ... 3476.67
123
124 Optimal solution found (tolerance 1.00e-08)
125 Best objective 4.528000000000e+03, best bound 4.528000000000e+03, gap 0.0000%
126 SP is solved
127 SP's optimal solution is'□4528
128
129 Itr = 0
130 Collect_LB = [692.0]
131 Collect_UB = [9748.0000000000004]
132 Collect_Hua = [0.0]
133 Collect_SPObjVal = [4528.0000000000002]
134 Collect_MPObjValNHua = [692.0]
135
136
137 Set parameter TimeLimit to value 12000
138 Set parameter MIPGap to value 0.0005
139 Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)
140
141 CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
142 Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
143
144 Optimize a model with 407539 rows, 137605 columns and 1110676 nonzeros
145 Model fingerprint: 0xae7f125
146 Variable types: 1 continuous, 137604 integer (137580 binary)
147 Coefficient statistics:
148 Matrix range [1e+00, 1e+10]
149 Objective range [1e+00, 2e+01]
150 Bounds range [1e+00, 1e+00]
151 RHS range [1e+00, 2e+10]
152 Warning: Model contains large matrix coefficients
153 Warning: Model contains large rhs
154 Consider reformulating model or setting NumericFocus parameter
155 to avoid numerical issues.
156 Presolve removed 266287 rows and 121758 columns (presolve time = 5s) ...
157 Presolve removed 383207 rows and 130935 columns
158 Presolve time: 6.67s
159 Presolved: 24332 rows, 6670 columns, 89424 nonzeros
160 Variable types: 0 continuous, 6670 integer (6652 binary)
161
162 Root simplex log...
163

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164 Iteration   Objective   Primal Inf.   Dual Inf.   Time
165      0   5.2200000e+03  7.340000e+02  0.000000e+00  7s
166    2853  5.2200000e+03  0.000000e+00  0.000000e+00  7s
167
168 Root relaxation: objective 5.220000e+03, 2853 iterations, 0.06 seconds (0.08 work units)
169
170   Nodes |   Current Node |   Objective Bounds |   Work
171 Expl Unexpl | Obj Depth IntInf | Incumbent   BestBd   Gap | It/Node Time
172
173    0    0 5220.00000    0    7      -5220.00000    -    -    7s
174    0    0 5220.00000    0   21      -5220.00000    -    -    7s
175    0    0 5220.00000    0   23      -5220.00000    -    -    7s
176    0    0 5220.00000    0    7      -5220.00000    -    -    8s
177    0    0 5220.00000    0   21      -5220.00000    -    -    8s
178    0    0 5220.00000    0   27      -5220.00000    -    -    8s
179 H    0    0                8420.0000000 5220.00000 38.0%    -    8s
180    0    0 5220.00000    0  19 8420.00000 5220.00000 38.0%    -    8s
181 H    0    0                5980.0000000 5220.00000 12.7%    -    9s
182    0    2 5220.00000    0  19 5980.00000 5220.00000 12.7%    -   10s
183   96   93 5220.00000    17 413 5980.00000 5220.00000 12.7%   807   15s
184 * 142 109                5620.0000000 5220.00000  7.12%   780   16s
185 H 195 119                5240.0000000 5220.00000  0.38%   711   18s
186 H 201 33                5220.0000000 5220.00000  0.00%   695   19s
187
188 Cutting planes:
189   Learned: 9
190   Gomory: 5
191   Cover: 4
192   Implied bound: 3
193   Clique: 27
194   MIR: 3
195   StrongCG: 4
196   Flow cover: 6
197   GUB cover: 1
198   Zero half: 3
199   RLT: 5
200   Relax-and-lift: 129
201
202 Explored 201 nodes (157916 simplex iterations) in 19.91 seconds (38.85 work units)
203 Thread count was 8 (of 8 available processors)
204
205 Solution count 5: 5220 5240 5620 ... 8420
206
207 Optimal solution found (tolerance 5.00e-04)
208 Best objective 5.220000000000e+03, best bound 5.220000000000e+03, gap 0.0000%
209 Set parameter MIPGap to value 1e-08
210 Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)
211
212 CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
213 Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
214
215 Optimize a model with 1153942 rows, 901813 columns and 7830144 nonzeros
216 Model fingerprint: 0x3ad47821
217 Variable types: 441325 continuous, 460488 integer (456438 binary)
218 Coefficient statistics:
219   Matrix range    [1e-01, 1e+10]
220   Objective range [6e-05, 5e+01]
221   Bounds range    [1e+00, 8e+01]
222   RHS range       [8e-01, 1e+10]
223 Warning: Model contains large matrix coefficients
224 Warning: Model contains large rhs
225   Consider reformulating model or setting NumericFocus parameter
226   to avoid numerical issues.
227 Presolve removed 1150781 rows and 900820 columns
228 Presolve time: 2.34s
229 Presolved: 3161 rows, 993 columns, 8390 nonzeros
230 Variable types: 4 continuous, 989 integer (566 binary)
231 Found heuristic solution: objective 3825.0731500
232 Found heuristic solution: objective 3911.3027795
233
234 Root relaxation: objective 4.764000e+03, 1027 iterations, 0.02 seconds (0.02 work units)
235
236   Nodes |   Current Node |   Objective Bounds |   Work
237 Expl Unexpl | Obj Depth IntInf | Incumbent   BestBd   Gap | It/Node Time
238
239    0    0 4764.00000    0    9 3911.30278 4764.00000 21.8%    -    2s
240 H    0    0                4214.5805573 4764.00000 13.0%    -    2s
241 H    0    0                4764.0000000 4764.00000  0.00%    -    2s
242    0    0 4764.00000    0    9 4764.00000 4764.00000  0.00%    -    2s
243
244 Explored 1 nodes (1527 simplex iterations) in 3.07 seconds (3.32 work units)
245 Thread count was 8 (of 8 available processors)
246
247 Solution count 4: 4764 4214.58 3911.3 3825.07

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248
249 Optimal solution found (tolerance 1.00e-08)
250 Best objective 4.764000000000e+03, best bound 4.764000000000e+03, gap 0.0000%
251 SP is solved
252 SP's optimal solution is'□4764
253
254 Itr = 1
255 Collect_LB = [692.0, 5220.0000000000002]
256 Collect_UB = [9748.0000000000004, 5456.0000000000002]
257 Collect_Hua = [0.0, 4528.0000000000002]
258 Collect_SPObjVal = [4528.0000000000002, 4764.0000000000002]
259 Collect_MPObjValNHua = [692.0, 692.0]
260
261
262 Set parameter TimeLimit to value 12000
263 Set parameter MIPGap to value 0.0005
264 Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)
265
266 CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
267 Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
268
269 Optimize a model with 407540 rows, 137605 columns and 1110689 nonzeros
270 Model fingerprint: 0x489a2909
271 Variable types: 1 continuous, 137604 integer (137580 binary)
272 Coefficient statistics:
273   Matrix range    [1e+00, 1e+10]
274   Objective range [1e+00, 2e+01]
275   Bounds range    [1e+00, 1e+00]
276   RHS range       [1e+00, 2e+10]
277 Warning: Model contains large matrix coefficients
278 Warning: Model contains large rhs
279   Consider reformulating model or setting NumericFocus parameter
280   to avoid numerical issues.
281 Presolve removed 268338 rows and 121950 columns (presolve time = 5s) ...
282 Presolve removed 383414 rows and 131007 columns
283 Presolve time: 6.61s
284 Presolved: 24126 rows, 6598 columns, 88375 nonzeros
285 Variable types: 0 continuous, 6598 integer (6580 binary)
286
287 Root simplex log...
288
289 Iteration   Objective      Primal Inf.   Dual Inf.    Time
290      0    5.4660000e+03  8.970000e+02  0.000000e+00   7s
291    2930    5.4660000e+03  0.000000e+00  0.000000e+00   7s
292
293 Root relaxation: objective 5.466000e+03, 2930 iterations, 0.07 seconds (0.11 work units)
294
295   Nodes | Current Node | Objective Bounds | Work
296 Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
297
298   0   0 5466.00000   0 14    - 5466.00000   -   -   6s
299   0   0 5466.00000   0 48    - 5466.00000   -   -   7s
300   0   0 5466.00000   0 65    - 5466.00000   -   -   7s
301   0   0 5466.00000   0 126   - 5466.00000   -   -   7s
302   0   0 5466.00000   0 121   - 5466.00000   -   -   7s
303 H   0   0          5986.0000000 5466.00000 8.69%   -   7s
304   0   0 5466.00000   0 33 5986.00000 5466.00000 8.69%   -   8s
305   0   0 5466.00000   0 47 5986.00000 5466.00000 8.69%   -   8s
306   0   0 5466.00000   0 35 5986.00000 5466.00000 8.69%   -   8s
307   0   0 5466.00000   0 58 5986.00000 5466.00000 8.69%   -   8s
308   0   0 5466.00000   0 55 5986.00000 5466.00000 8.69%   -   8s
309   0   0 5466.00000   0 27 5986.00000 5466.00000 8.69%   -   8s
310   0   0 5466.00000   0 34 5986.00000 5466.00000 8.69%   -   8s
311   0   0 5466.00000   0 140 5986.00000 5466.00000 8.69%   -   9s
312   0   0 5466.00000   0 72 5986.00000 5466.00000 8.69%   -   9s
313   0   0 5466.00000   0 22 5986.00000 5466.00000 8.69%   -   9s
314   0   0 5466.00000   0 98 5986.00000 5466.00000 8.69%   -   9s
315   0   0 5466.00000   0 55 5986.00000 5466.00000 8.69%   -   9s
316   0   0 5466.00000   0 23 5986.00000 5466.00000 8.69%   -  10s
317   0   0 5466.00000   0 33 5986.00000 5466.00000 8.69%   -  10s
318 H   0   0          5466.0000000 5466.00000 0.00%   -  11s
319   0   0 5466.00000   0 33 5466.00000 5466.00000 0.00%   -  11s
320
321 Cutting planes:
322 Cover: 104
323 Implied bound: 19
324 Clique: 124
325 MIR: 35
326 StrongCG: 29
327 GUB cover: 21
328 RLT: 2
329 Relax-and-lift: 140
330 BQP: 4
331

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332 Explored 1 nodes (27552 simplex iterations) in 11.54 seconds (16.97 work units)
333 Thread count was 8 (of 8 available processors)
334
335 Solution count 2: 5466 5986
336
337 Optimal solution found (tolerance 5.00e-04)
338 Best objective 5.466000000000e+03, best bound 5.466000000000e+03, gap 0.0000%
339 Set parameter MIPGap to value 1e-08
340 Gurobi Optimizer version 10.0.2 build v10.0.2rc0 (win64)
341
342 CPU model: 11th Gen Intel(R) Core(TM) i7-11370H @ 3.30GHz, instruction set [SSE2|AVX|AVX2|AVX512]
343 Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
344
345 Optimize a model with 1153942 rows, 901813 columns and 7830144 nonzeros
346 Model fingerprint: 0x4f0e5c5c
347 Variable types: 441325 continuous, 460488 integer (456438 binary)
348 Coefficient statistics:
349   Matrix range    [1e-01, 1e+10]
350   Objective range [6e-05, 5e+01]
351   Bounds range    [1e+00, 8e+01]
352   RHS range       [8e-01, 1e+10]
353 Warning: Model contains large matrix coefficients
354 Warning: Model contains large rhs
355   Consider reformulating model or setting NumericFocus parameter
356   to avoid numerical issues.
357 Presolve removed 1149947 rows and 900465 columns
358 Presolve time: 2.26s
359 Presolved: 3995 rows, 1348 columns, 10664 nonzeros
360 Variable types: 4 continuous, 1344 integer (781 binary)
361 Found heuristic solution: objective 3289.6666667
362
363 Root relaxation: objective 4.628667e+03, 1401 iterations, 0.01 seconds (0.02 work units)
364
365   Nodes | Current Node | Objective Bounds | Work
366 Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time
367
368 H  0  0          4628.6666667 12030.0000 160% - 2s
369   0  0  -  0  4628.66667 4628.66667 0.00% - 2s
370
371 Explored 1 nodes (1682 simplex iterations) in 3.00 seconds (3.29 work units)
372 Thread count was 8 (of 8 available processors)
373
374 Solution count 2: 4628.67 3289.67
375
376 Optimal solution found (tolerance 1.00e-08)
377 Best objective 4.628666666667e+03, best bound 4.628666666667e+03, gap 0.0000%
378 SP is solved
379 SP's optimal solution is'□4628
380
381 Itr = 2
382 Collect_LB = [692.0, 5220.0000000000002, 5466.0000000000002]
383 Collect_UB = [9748.0000000000004, 5456.0000000000002, 5330.6666666666668]
384 Collect_Hua = [0.0, 4528.0000000000002, 4764.0000000000002]
385 Collect_SPObjVal = [4528.0000000000002, 4764.0000000000002, 4628.6666666666668]
386 Collect_MPObjValNHua = [692.0, 692.0, 702.0]
387
388
389 Ops, stop iteration
390 Values adopted from the Itr-1' th iteration, and Itr = {2}, judgeCount = {1}
391
392 ~~~~~judgeCount = 1, SPObj_SPF = 4764.0000000000002
393 Vessel i: 0: pi: 0-5, ai-di: 3-22, gi_SP-gpi_SP: 0.000000-0.000000, ai_SP-di: 3-22, taoi-deltai: 3-21, taoPi_SP-deltaPi_SP: 15-21, betaNi: 18
, bi: 18
394 Vessel i: 1: pi: 5-12, ai-di: 4-25, gi_SP-gpi_SP: 0.000000-0.000000, ai_SP-di: 4-25, taoi-deltai: 4-24, taoPi_SP-deltaPi_SP: 4-24, betaNi: 20
, bi: 20
395 Vessel i: 2: pi: 12-18, ai-di: 18-26, gi_SP-gpi_SP: 0.000000-0.000000, ai_SP-di: 18-26, taoi-deltai: 18-25, taoPi_SP-deltaPi_SP: 18-25,
betaNi: 7, bi: 7
396 Vessel i: 3: pi: 12-18, ai-di: 26-61, gi_SP-gpi_SP: 0.000000-0.000000, ai_SP-di: 26-61, taoi-deltai: 26-60, taoPi_SP-deltaPi_SP: 26-60,
betaNi: 34, bi: 34
397 Vessel i: 4: pi: 6-12, ai-di: 20-68, gi_SP-gpi_SP: 0.700000-0.900000, ai_SP-di: 23-68, taoi-deltai: 25-52, taoPi_SP-deltaPi_SP: 25-52, betaNi
: 27, bi: 27
398 Vessel i: 5: pi: 28-34, ai-di: 35-60, gi_SP-gpi_SP: 0.500000-0.300000, ai_SP-di: 39-60, taoi-deltai: 35-44, taoPi_SP-deltaPi_SP: 39-44,
betaNi: 9, bi: 9
399
400 round LB = [692, 5220, 5466]
401 round UB = [9748, 5456, 5331]
402 round Hua = [0, 4528, 4764]
403 round SPObjVal = [4528, 4764, 4629]
404 round MPObjValNHua = [692, 692, 702]
405
406 OptimalObj = 5466.0000000000002
407 Time: 259.000000
408
409

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unknown

410  
411