PS C:\Users\Martonosi\Dropbox\research\COVID-19 Vaccine Distribution\international-vaccine-allocation> python3 seir\_QP2.py input\_data/T2.1\_short.xml

Set parameter Username

Presolve removed 152 rows and 170 columns

Presolve time: 0.01s

Presolved: 853 rows, 423 columns, 2154 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 423 continuous, 0 integer (0 binary)

Root relaxation: objective 6.461817e+00, 446 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 6.46182 0 133 - 6.46182 - - 0s

H 0 0 7.6404665 6.46182 15.4% - 0s

H 0 0 7.6402708 6.46182 15.4% - 0s

0 0 6.46195 0 132 7.64027 6.46195 15.4% - 0s

H 0 0 7.1528892 6.46195 9.66% - 0s

0 2 6.46195 0 132 7.15289 6.46195 9.66% - 0s

H 5664 1974 7.1528885 6.66450 6.83% 11.5 3s

H 6990 2937 7.1523308 6.66450 6.82% 11.6 3s

H10009 5149 7.1523307 6.66450 6.82% 10.9 4s

H11008 6298 7.1502737 6.66450 6.79% 10.8 4s

11519 6716 7.11059 1150 17 7.15027 6.66450 6.79% 10.6 5s

\*26392 16757 376 7.1110465 6.66450 6.28% 8.0 8s

29086 18319 7.11059 3404 19 7.11105 6.66450 6.28% 8.1 10s

46470 24095 7.10662 152 99 7.11105 6.66450 6.28% 9.7 15s

\*47166 16833 538 7.1085020 6.66450 6.25% 9.7 15s

63948 21671 6.71206 75 117 7.10850 6.66450 6.25% 10.6 20s

\*78834 25123 296 7.0974761 6.66450 6.10% 10.8 22s

H78978 25148 7.0973937 6.66450 6.10% 10.8 23s

86840 27444 infeasible 87 7.09739 6.66450 6.10% 10.9 25s

110911 33906 infeasible 125 7.09739 6.66450 6.10% 11.2 30s

\*116338 35622 284 7.0973876 6.66450 6.10% 11.2 31s

\*116340 35622 281 7.0973876 6.66450 6.10% 11.2 31s

H117224 36063 7.0973875 6.66450 6.10% 11.3 31s

\*130470 31147 507 7.0748088 6.66450 5.80% 11.7 34s

H131104 31231 7.0747343 6.66450 5.80% 11.7 35s

151683 37406 6.97601 121 103 7.07473 6.66450 5.80% 12.3 40s

174898 43912 6.80696 129 96 7.07473 6.66450 5.80% 12.5 45s

195756 49979 6.67474 67 103 7.07473 6.66450 5.80% 12.7 50s

217357 56272 7.04800 102 98 7.07473 6.66450 5.80% 12.9 55s

239668 63012 cutoff 72 7.07473 6.66450 5.80% 13.0 60s

H247482 64535 7.0713298 6.66450 5.75% 12.9 62s

261004 68000 infeasible 121 7.07133 6.66450 5.75% 12.9 65s

280022 73959 cutoff 68 7.07133 6.66450 5.75% 12.9 70s

H294356 79856 7.0706514 6.66450 5.74% 12.9 73s

H298476 81133 7.0654294 6.66450 5.67% 12.9 74s

H299461 80357 7.0654085 6.66450 5.67% 12.9 74s

H299482 79964 7.0654084 6.66450 5.67% 12.9 74s

300923 80212 6.66450 67 120 7.06541 6.66450 5.67% 12.9 75s

320115 88206 7.06326 186 101 7.06541 6.66450 5.67% 12.9 80s

\*334548 92863 407 7.0654057 6.66450 5.67% 12.8 83s

H335040 93042 7.0654056 6.66450 5.67% 12.8 83s

339743 94739 6.73415 307 59 7.06541 6.66450 5.67% 12.8 85s

357407 100662 infeasible 212 7.06541 6.66450 5.67% 12.9 90s

375307 104921 6.81436 566 44 7.06541 6.66450 5.67% 12.9 95s

395222 112148 6.75865 1438 75 7.06541 6.66450 5.67% 13.2 100s

414412 117808 6.73415 328 47 7.06541 6.66450 5.67% 13.3 105s

428698 123123 6.73188 136 101 7.06541 6.66450 5.67% 13.4 110s

447835 130251 6.73415 347 45 7.06541 6.66450 5.67% 13.5 115s

465415 136442 6.73415 492 45 7.06541 6.66450 5.67% 13.7 120s

Explored 465519 nodes (6383427 simplex iterations) in 120.01 seconds (90.96 work units)

Thread count was 8 (of 8 available processors)

Solution count 10: 7.06541 7.06541 7.06541 ... 7.09739

Time limit reached

Best objective 7.065405624502e+00, best bound 6.664502956501e+00, gap 5.6742%

Optimize failed at lambda = 0.01 Status = 9

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 490 rows, 440 columns and 1526 nonzeros

Model fingerprint: 0x8612afc0

Model has 304 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 394 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

Loaded MIP start from previous solve with objective 7.06541

Presolve removed 397 rows and 170 columns

Presolve time: 0.02s

Presolved: 853 rows, 423 columns, 2154 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 423 continuous, 0 integer (0 binary)

Root relaxation: objective 6.462030e+00, 462 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 6.46203 0 132 7.06541 6.46203 8.54% - 0s

0 0 6.89197 0 132 7.06541 6.89197 2.45% - 1s

0 2 6.89197 0 132 7.06541 6.89197 2.45% - 1s

2981 1021 6.89197 130 81 7.06541 6.89197 2.45% 14.8 5s

18374 6594 6.94630 79 132 7.06541 6.89197 2.45% 17.1 10s

36265 12337 7.01556 58 128 7.06541 6.89197 2.45% 17.3 15s

54529 19237 6.89197 80 121 7.06541 6.89197 2.45% 16.5 20s

72192 25243 6.89197 114 97 7.06541 6.89197 2.45% 16.4 25s

89797 32399 6.94613 77 128 7.06541 6.89197 2.45% 16.5 30s

102340 37540 6.89197 76 119 7.06541 6.89197 2.45% 16.9 35s

115043 43610 7.02401 577 57 7.06541 6.89197 2.45% 18.2 40s

127111 46612 cutoff 3502 7.06541 6.89197 2.45% 17.8 45s

142456 53367 7.06532 303 50 7.06541 6.89197 2.45% 17.8 50s

157545 56590 7.06533 3729 36 7.06541 6.89197 2.45% 17.2 55s

172116 64117 7.06414 255 84 7.06541 6.89197 2.45% 17.3 60s

H176472 64518 7.0641415 6.89197 2.44% 17.1 62s

H177535 64085 7.0640880 6.89197 2.44% 17.1 62s

186014 67227 7.06024 141 94 7.06409 6.89197 2.44% 16.9 65s

201535 73050 infeasible 118 7.06409 6.89197 2.44% 16.7 70s

220785 82971 7.06343 1767 51 7.06409 6.89197 2.44% 16.2 75s

240960 91908 6.89197 179 96 7.06409 6.89197 2.44% 15.7 80s

H249109 94414 7.0640377 6.89197 2.44% 15.6 81s

H250283 95146 7.0640364 6.89197 2.44% 15.6 82s

H252317 94763 7.0639889 6.89197 2.44% 15.5 83s

261155 96950 cutoff 230 7.06399 6.89197 2.44% 15.4 85s

278089 101641 6.89197 205 88 7.06399 6.89197 2.44% 15.2 90s

295454 104951 7.05685 183 92 7.06399 6.89197 2.44% 15.0 95s

312691 109735 infeasible 108 7.06399 6.89197 2.44% 15.0 100s

330933 115434 6.89197 128 99 7.06399 6.89197 2.44% 15.0 105s

348889 122362 6.98756 123 99 7.06399 6.89197 2.44% 14.9 110s

361828 125967 7.02704 125 91 7.06399 6.89197 2.44% 15.1 115s

379178 131046 6.89197 106 91 7.06399 6.89197 2.44% 15.3 120s

Explored 380095 nodes (5809644 simplex iterations) in 120.02 seconds (80.08 work units)

Thread count was 8 (of 8 available processors)

Solution count 6: 7.06399 7.06404 7.06404 ... 7.06541

Time limit reached

Best objective 7.063988922872e+00, best bound 6.891970987774e+00, gap 2.4351%

Optimize failed at lambda = 0.01 Status = 9

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 245 rows, 440 columns and 763 nonzeros

Model fingerprint: 0x0c4655f5

Model has 456 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 149 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

Loaded MIP start from previous solve with objective 21.6611

Presolve removed 152 rows and 170 columns

Presolve time: 0.01s

Presolved: 853 rows, 423 columns, 2154 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 423 continuous, 0 integer (0 binary)

Root relaxation: objective 2.011110e+01, 446 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 20.11110 0 132 21.66108 20.11110 7.16% - 0s

Explored 1 nodes (448 simplex iterations) in 0.73 seconds (0.39 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 21.6611

Optimal solution found (tolerance 1.00e-04)

Best objective 2.166108449137e+01, best bound 2.166108449137e+01, gap 0.0000%

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 245 rows, 440 columns and 763 nonzeros

Model fingerprint: 0x87b7f928

Model has 608 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 149 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

MIP start from previous solve did not produce a new incumbent solution

Presolve removed 90 rows and 134 columns

Presolve time: 0.01s

Presolved: 915 rows, 459 columns, 2332 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 459 continuous, 0 integer (0 binary)

Root relaxation: objective 7.425870e+01, 513 iterations, 0.00 seconds (0.01 work units)

Nodes | Current Node | Objective Bounds | Work

Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time

0 0 74.25870 0 132 - 74.25870 - - 0s

0 0 76.44675 0 132 - 76.44675 - - 0s

0 2 76.44675 0 132 - 76.44675 - - 0s

6256 2996 79.81305 154 92 - 79.57705 - 8.2 5s

\*14285 2248 522 79.8210427 79.57705 0.31% 10.0 9s

17916 3562 infeasible 98 79.82104 79.57705 0.31% 9.3 10s

\*28446 6868 320 79.8210426 79.57705 0.31% 9.1 12s

\*28500 6795 331 79.8210422 79.57705 0.31% 9.1 12s

40855 12613 cutoff 117 79.82104 79.57705 0.31% 7.5 15s

74050 33196 79.82051 384 74 79.82104 79.57705 0.31% 4.6 20s

H93084 47115 79.8210420 79.57705 0.31% 4.9 24s

96597 49176 79.57705 127 111 79.82104 79.57705 0.31% 4.9 25s

\*108100 25421 572 79.8207751 79.57705 0.31% 5.0 27s

117676 29293 79.74928 169 110 79.82078 79.57705 0.31% 5.2 30s

137244 35012 79.75975 265 104 79.82078 79.57705 0.31% 5.7 35s

H152324 42851 79.8207735 79.57705 0.31% 5.9 38s

156485 45084 79.81920 133 105 79.82077 79.57705 0.31% 6.0 40s

\*161052 38300 268 79.8207302 79.57705 0.31% 6.2 41s

H162277 38737 79.8207269 79.57705 0.31% 6.2 41s

175017 43688 79.57705 195 108 79.82073 79.57705 0.31% 6.6 45s

194479 54203 79.82070 363 40 79.82073 79.57705 0.31% 6.8 50s

214111 61505 79.70751 162 103 79.82073 79.57705 0.31% 7.3 55s

H216318 55836 79.8207255 79.57705 0.31% 7.3 55s

234612 62154 79.57705 92 107 79.82073 79.57705 0.31% 7.6 60s

251578 68021 79.77027 123 104 79.82073 79.57705 0.31% 7.8 65s

271739 74749 79.68304 198 100 79.82073 79.57705 0.31% 7.9 70s

292049 81652 79.82070 173 107 79.82073 79.57705 0.31% 7.9 75s

311677 86982 79.68341 194 107 79.82073 79.57705 0.31% 7.9 80s

331347 93685 79.68005 222 105 79.82073 79.57705 0.31% 8.1 85s

349354 100423 infeasible 151 79.82073 79.57705 0.31% 8.2 90s

369189 108068 79.68209 141 100 79.82073 79.57705 0.31% 8.3 95s

388473 114020 79.81571 163 99 79.82073 79.57705 0.31% 8.5 100s

407944 120505 79.81121 161 105 79.82073 79.57705 0.31% 8.6 105s

427613 127596 79.77364 143 101 79.82073 79.57705 0.31% 8.7 110s

448550 135270 79.77025 142 102 79.82073 79.57705 0.31% 8.8 115s

468148 141317 79.81192 143 104 79.82073 79.57705 0.31% 8.9 120s

Explored 468817 nodes (4158269 simplex iterations) in 120.01 seconds (67.14 work units)

Thread count was 8 (of 8 available processors)

Solution count 9: 79.8207 79.8207 79.8207 ... 79.821

Time limit reached

Warning: max constraint violation (3.0121e-06) exceeds tolerance

Best objective 7.982072554551e+01, best bound 7.957704674254e+01, gap 0.3053%

Optimize failed at lambda = 0.16 Status = 9

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 245 rows, 440 columns and 763 nonzeros

Model fingerprint: 0x8f2af04a

Model has 760 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 149 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

MIP start from previous solve did not produce a new incumbent solution

Presolve removed 90 rows and 134 columns

Presolve time: 0.01s

Presolved: 915 rows, 459 columns, 2332 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 459 continuous, 0 integer (0 binary)

Root relaxation: objective 5.353218e+01, 515 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 53.53218 0 132 - 53.53218 - - 0s

0 0 54.72534 0 132 - 54.72534 - - 0s

0 2 54.72534 0 132 - 54.72534 - - 0s

5074 3208 57.26857 92 91 - 55.40357 - 8.3 5s

22169 10179 60.03414 528 49 - 55.40357 - 5.9 10s

38097 18678 60.09016 1242 40 - 55.40357 - 7.1 15s

62731 36909 infeasible 2710 - 55.40357 - 5.9 20s

84286 52278 infeasible 49 - 55.95352 - 6.4 25s

108106 67772 infeasible 2071 - 55.95352 - 6.0 30s

133470 82009 57.58527 295 79 - 56.07581 - 5.5 35s

157875 92692 infeasible 1390 - 56.07581 - 5.3 40s

H160684 50305 57.7175534 56.07581 2.84% 5.3 40s

\*183157 54706 1028 57.7175527 56.07581 2.84% 5.0 44s

\*184413 54877 1030 57.7175526 56.07581 2.84% 4.9 44s

186522 55174 57.66677 1340 60 57.71755 56.07581 2.84% 4.9 45s

216491 65019 57.24389 104 87 57.71755 56.07581 2.84% 4.6 50s

\*228246 59557 1038 57.6040388 56.07581 2.65% 4.6 52s

244783 69937 57.58875 2298 18 57.60404 56.07581 2.65% 4.5 55s

272651 87184 56.72864 379 114 57.60404 56.07581 2.65% 4.3 60s

\*282156 83801 468 57.6005443 56.07581 2.65% 4.3 61s

\*287462 83724 453 57.5986700 56.07581 2.64% 4.3 62s

298871 90281 57.58875 1308 29 57.59867 56.07581 2.64% 4.3 65s

323149 103546 57.58875 3925 34 57.59867 56.07581 2.64% 4.4 70s

350962 123117 57.58870 567 44 57.59867 56.07581 2.64% 4.3 75s

381782 147022 57.28049 86 103 57.59867 56.07581 2.64% 4.2 80s

\*395742 135089 727 57.5974397 56.07581 2.64% 4.2 82s

407133 140075 57.58891 831 59 57.59744 56.07581 2.64% 4.3 85s

\*427558 144859 1876 57.5965739 56.07581 2.64% 4.2 88s

434754 148163 57.58891 3948 59 57.59657 56.07581 2.64% 4.3 90s

\*455191 146599 1607 57.5946314 56.07581 2.64% 4.5 94s

457130 148219 57.59013 533 87 57.59463 56.07581 2.64% 4.5 95s

481038 167688 57.55123 296 102 57.59463 56.07581 2.64% 4.5 100s

\*483732 132649 1607 57.5903287 56.07581 2.63% 4.5 100s

503448 143989 infeasible 313 57.59033 56.07581 2.63% 4.6 105s

\*511569 115087 1121 57.5888337 56.07581 2.63% 4.6 106s

526544 123021 cutoff 265 57.58883 56.07581 2.63% 4.6 110s

554669 143106 cutoff 327 57.58883 56.07581 2.63% 4.5 115s

581137 156018 57.58770 348 106 57.58883 56.07581 2.63% 4.5 120s

Explored 581318 nodes (2624340 simplex iterations) in 120.01 seconds (56.58 work units)

Thread count was 8 (of 8 available processors)

Solution count 10: 57.5888 57.5903 57.5946 ... 57.7176

Time limit reached

Best objective 5.758883372052e+01, best bound 5.607581417786e+01, gap 2.6273%

Optimize failed at lambda = 0.11415999999999998 Status = 9

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 245 rows, 440 columns and 763 nonzeros

Model fingerprint: 0xa1a16cbd

Model has 912 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 149 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

Loaded MIP start from previous solve with objective 43.8539

Presolve removed 90 rows and 134 columns

Presolve time: 0.01s

Presolved: 915 rows, 459 columns, 2332 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 459 continuous, 0 integer (0 binary)

Root relaxation: objective 4.072711e+01, 502 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 40.72711 0 132 43.85389 40.72711 7.13% - 0s

0 0 41.82824 0 132 43.85389 41.82824 4.62% - 0s

0 2 41.82824 0 132 43.85389 41.82824 4.62% - 0s

H 1076 583 43.8538781 41.95710 4.33% 17.9 3s

Explored 1130 nodes (21403 simplex iterations) in 3.77 seconds (1.97 work units)

Thread count was 8 (of 8 available processors)

Solution count 2: 43.8539 43.8539

Optimal solution found (tolerance 1.00e-04)

Best objective 4.385387808078e+01, best bound 4.385387808078e+01, gap 0.0000%

Gurobi Optimizer version 9.5.1 build v9.5.1rc2 (win64)

Thread count: 4 physical cores, 8 logical processors, using up to 8 threads

Optimize a model with 245 rows, 440 columns and 763 nonzeros

Model fingerprint: 0x22904916

Model has 1064 quadratic constraints

Coefficient statistics:

Matrix range [7e-03, 1e+00]

QMatrix range [2e-06, 1e-05]

QLMatrix range [8e-01, 1e+00]

Objective range [1e-07, 1e+00]

Bounds range [0e+00, 0e+00]

RHS range [2e+00, 9e+04]

Presolve removed 149 rows and 164 columns

Continuous model is non-convex -- solving as a MIP

Loaded MIP start from previous solve with objective 35.3613

Presolve removed 90 rows and 134 columns

Presolve time: 0.01s

Presolved: 915 rows, 459 columns, 2332 nonzeros

Presolved model has 152 bilinear constraint(s)

Variable types: 459 continuous, 0 integer (0 binary)

Root relaxation: objective 3.487925e+01, 503 iterations, 0.00 seconds (0.01 work units)

Nodes | Current Node | Objective Bounds | Work

Expl Unexpl | Obj Depth IntInf | Incumbent BestBd Gap | It/Node Time

0 0 34.87925 0 133 35.36126 34.87925 1.36% - 0s

0 0 34.87925 0 133 35.36126 34.87925 1.36% - 0s

0 2 34.87925 0 133 35.36126 34.87925 1.36% - 0s

Explored 13 nodes (766 simplex iterations) in 0.74 seconds (0.35 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 35.3613

Optimal solution found (tolerance 1.00e-04)

Best objective 3.536126192606e+01, best bound 3.536126192606e+01, gap 0.0000%

QP count: 7 Infeas count: 0