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

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Set parameter NonConvex to value 2

Set parameter TimeLimit to value 600

Set parameter MIPGap to value 0.1

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: 0x230788f0

Model has 152 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

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, 0.00 seconds (0.01 work units)

Nodes | Current Node | Objective Bounds | Work

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

0 0 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

Explored 1 nodes (480 simplex iterations) in 0.19 seconds (0.07 work units)

Thread count was 8 (of 8 available processors)

Solution count 2: 7.15289 7.64027

Optimal solution found (tolerance 1.00e-01)

Best objective 7.152889169424e+00, best bound 6.461952616462e+00, gap 9.6595%

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: 0x167bcc27

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

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

Presolve removed 335 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 6.737450e+00, 499 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 6.73745 0 134 - 6.73745 - - 0s

0 0 6.73745 0 134 - 6.73745 - - 0s

0 2 6.73745 0 134 - 6.73745 - - 0s

3662 1413 12.20542 130 99 - 7.59560 - 30.8 5s

\*12306 639 880 7.0898157 7.08982 0.00% 22.1 8s

Explored 12523 nodes (277377 simplex iterations) in 8.48 seconds (5.20 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 7.08982

Optimal solution found (tolerance 1.00e-01)

Best objective 7.089815737722e+00, best bound 7.089815737722e+00, 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: 0x82a49252

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

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

Presolve removed 64 rows and 134 columns

Presolve time: 0.01s

Presolved: 941 rows, 459 columns, 2432 nonzeros

Presolved model has 152 bilinear constraint(s)

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

Root relaxation: objective 2.121204e+01, 503 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 21.21204 0 134 - 21.21204 - - 0s

0 0 21.21204 0 134 - 21.21204 - - 1s

0 2 21.21204 0 134 - 21.21204 - - 1s

4643 1513 25.07969 165 89 - 25.07969 - 9.5 5s

20221 13708 25.07969 1209 34 - 25.07969 - 7.2 10s

50172 37216 25.07969 2731 34 - 25.07969 - 5.0 15s

72441 52176 25.07969 230 94 - 25.07969 - 5.9 20s

88527 66397 25.07969 556 56 - 25.07969 - 7.0 25s

104573 80893 25.07969 894 55 - 25.07969 - 8.2 30s

120398 95324 25.07969 1209 55 - 25.07969 - 8.8 35s

\*127471 1735 1893 21.9859599 21.98596 0.00% 9.2 37s

Explored 128742 nodes (1181144 simplex iterations) in 37.46 seconds (20.94 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 21.986

No other solutions better than 21.986

Optimal solution found (tolerance 1.00e-01)

Best objective 2.196766505108e+01, best bound 2.196766505108e+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: 0xd5b00b98

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 38 rows and 134 columns

Presolve time: 0.01s

Presolved: 967 rows, 459 columns, 2532 nonzeros

Presolved model has 152 bilinear constraint(s)

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

Warning: 1 variables dropped from basis

Warning: switch to quad precision

Root relaxation: objective 3.131399e+00, 609 iterations, 0.02 seconds (0.02 work units)

Nodes | Current Node | Objective Bounds | Work

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

0 0 3.13140 0 137 - 3.13140 - - 0s

0 0 3.13140 0 137 - 3.13140 - - 0s

0 2 3.13140 0 137 - 3.13140 - - 0s

5033 2793 3.36351 306 65 - 3.31913 - 16.2 5s

\*11649 1196 641 3.3976191 3.31913 2.31% 12.8 7s

\*11688 1196 658 3.3976191 3.31913 2.31% 12.8 7s

Explored 11701 nodes (149972 simplex iterations) in 7.08 seconds (4.44 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 3.39762

Optimal solution found (tolerance 1.00e-01)

Best objective 3.397619122758e+00, best bound 3.319129977991e+00, gap 2.3101%

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: 0x6753a800

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

Loaded MIP start from previous solve with objective 2.47408

Presolve removed 38 rows and 134 columns

Presolve time: 0.02s

Presolved: 967 rows, 459 columns, 2532 nonzeros

Presolved model has 152 bilinear constraint(s)

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

Root relaxation: objective 2.197461e+00, 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 2.30636 0 133 2.47408 2.30636 6.78% - 0s

Explored 1 nodes (505 simplex iterations) in 0.70 seconds (0.57 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 2.47408

Optimal solution found (tolerance 1.00e-01)

Best objective 2.474081269023e+00, best bound 2.306361180236e+00, gap 6.7791%

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: 0x3a5b666b

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 3.04483

Presolve removed 38 rows and 134 columns

Presolve time: 0.02s

Presolved: 967 rows, 459 columns, 2532 nonzeros

Presolved model has 152 bilinear constraint(s)

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

Root relaxation: objective 2.774705e+00, 520 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 2.77471 0 137 3.04483 2.77471 8.87% - 0s

Explored 1 nodes (520 simplex iterations) in 0.73 seconds (0.53 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 3.04483

Optimal solution found (tolerance 1.00e-01)

Best objective 3.044827662632e+00, best bound 2.774705141281e+00, gap 8.8715%

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: 0xb97df113

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 2.82687

Presolve removed 38 rows and 134 columns

Presolve time: 0.02s

Presolved: 967 rows, 459 columns, 2532 nonzeros

Presolved model has 152 bilinear constraint(s)

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

Root relaxation: objective 2.523010e+00, 841 iterations, 0.05 seconds (0.06 work units)

Nodes | Current Node | Objective Bounds | Work

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

0 0 2.52301 0 133 2.82687 2.52301 10.7% - 0s

0 0 2.54156 0 133 2.82687 2.54156 10.1% - 0s

H 0 0 2.8238780 2.54156 10.0% - 0s

Explored 1 nodes (841 simplex iterations) in 0.97 seconds (0.76 work units)

Thread count was 8 (of 8 available processors)

Solution count 2: 2.82388 2.82687

Optimal solution found (tolerance 1.00e-01)

Best objective 2.823878044188e+00, best bound 2.541564216697e+00, gap 9.9974%

QP count: 7 Infeas count: 0