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

Academic license - for non-commercial use only - expires 2023-10-12

Set parameter NonConvex to value 2

Set parameter TimeLimit to value 600

Set parameter MIPGap to value 0.02

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, 0.01 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 6.63225 7.28% 11.5 2s

H 6990 2937 7.1523308 6.63225 7.27% 11.6 3s

H10009 5149 7.1523307 6.63225 7.27% 10.9 4s

H11008 6298 7.1502737 6.63225 7.24% 10.8 4s

14072 8733 7.11059 1528 17 7.15027 6.63225 7.24% 9.7 5s

\*26392 16757 376 7.1110465 6.63225 6.73% 8.0 8s

32176 19529 7.11059 3485 19 7.11105 6.63225 6.73% 8.3 10s

\*47166 16833 538 7.1085020 6.63225 6.70% 9.7 13s

49209 17169 6.67705 72 109 7.10850 6.63225 6.70% 9.8 15s

71863 23886 6.68332 70 111 7.10850 6.63225 6.70% 10.8 20s

\*78834 25123 296 7.0974761 6.63225 6.55% 10.8 21s

H78978 25148 7.0973937 6.63225 6.55% 10.8 21s

96148 30048 6.75408 98 113 7.09739 6.63225 6.55% 11.0 25s

\*116338 35622 284 7.0973876 6.63225 6.55% 11.2 29s

\*116340 35622 281 7.0973876 6.63225 6.55% 11.2 29s

H117224 36063 7.0973875 6.63225 6.55% 11.3 29s

118865 36691 infeasible 87 7.09739 6.63225 6.55% 11.3 30s

\*130470 31147 507 7.0748088 6.63225 6.26% 11.7 32s

H131104 31231 7.0747343 6.63225 6.25% 11.7 32s

140945 34019 6.75826 141 114 7.07473 6.63225 6.25% 12.1 35s

165844 41312 infeasible 126 7.07473 6.63225 6.25% 12.4 40s

188274 47750 cutoff 78 7.07473 6.63225 6.25% 12.6 45s

211560 54301 infeasible 120 7.07473 6.63225 6.25% 12.8 50s

234496 61269 6.73502 88 93 7.07473 6.63225 6.25% 13.0 55s

H247482 64535 7.0713298 6.63225 6.21% 12.9 57s

256419 66767 6.66483 66 121 7.07133 6.63225 6.21% 12.9 60s

278026 73055 7.00917 92 133 7.07133 6.63225 6.21% 12.9 65s

H294356 79856 7.0706514 6.63225 6.20% 12.9 68s

H298476 81133 7.0654294 6.63225 6.13% 12.9 69s

H299461 80357 7.0654085 6.63225 6.13% 12.9 69s

H299482 79964 7.0654084 6.63225 6.13% 12.9 69s

300923 80212 6.63339 67 120 7.06541 6.63225 6.13% 12.9 70s

320115 88206 7.06326 186 101 7.06541 6.63225 6.13% 12.9 75s

\*334548 92863 407 7.0654057 6.63225 6.13% 12.8 78s

H335040 93042 7.0654056 6.63225 6.13% 12.8 78s

339743 94739 6.73415 307 59 7.06541 6.63225 6.13% 12.8 80s

357404 100370 cutoff 117 7.06541 6.63225 6.13% 12.9 85s

372479 103536 6.73415 429 46 7.06541 6.63225 6.13% 12.9 90s

389764 110354 6.75865 1302 72 7.06541 6.63225 6.13% 13.2 95s

409794 116179 6.73408 171 82 7.06541 6.63225 6.13% 13.3 100s

423013 121104 6.95602 419 45 7.06541 6.63225 6.13% 13.4 105s

441071 127801 6.73415 213 81 7.06541 6.63225 6.13% 13.5 110s

459676 134530 6.73415 440 45 7.06541 6.63225 6.13% 13.6 115s

477541 141361 6.73415 589 45 7.06541 6.63225 6.13% 13.8 120s

493554 147323 6.73415 777 46 7.06541 6.63225 6.13% 13.9 125s

510638 153613 6.72931 136 93 7.06541 6.63225 6.13% 14.2 130s

527951 160153 6.63225 64 116 7.06541 6.63225 6.13% 14.3 135s

548159 166815 6.73391 174 83 7.06541 6.63225 6.13% 14.4 140s

564525 173808 cutoff 130 7.06541 6.63225 6.13% 14.5 145s

584134 182429 6.72857 140 102 7.06541 6.63225 6.13% 14.7 150s

602754 190503 6.63225 58 122 7.06541 6.63225 6.13% 14.7 155s

619261 197117 7.06395 287 60 7.06541 6.63225 6.13% 14.8 160s

639284 206429 6.80380 472 80 7.06541 6.63225 6.13% 14.8 165s

660298 215987 cutoff 92 7.06541 6.63225 6.13% 14.8 170s

683076 224573 6.73416 357 52 7.06541 6.63225 6.13% 14.8 175s

699553 230764 6.73416 924 52 7.06541 6.63225 6.13% 14.8 180s

719486 238669 6.73416 1586 52 7.06541 6.63225 6.13% 14.9 185s

739118 246053 6.73416 2182 52 7.06541 6.63225 6.13% 14.9 190s

756470 253304 6.73416 2821 52 7.06541 6.63225 6.13% 15.0 195s

778568 261488 6.73416 3502 52 7.06541 6.63225 6.13% 15.0 200s

800607 269050 cutoff 152 7.06541 6.63225 6.13% 15.0 205s

821715 276427 7.05551 89 109 7.06541 6.63225 6.13% 14.9 210s

H837455 281597 7.0654055 6.63225 6.13% 14.9 214s

H837486 279658 7.0654041 6.63225 6.13% 14.9 214s

840477 280806 6.91368 297 80 7.06540 6.63225 6.13% 14.9 215s

863221 289433 7.02811 87 115 7.06540 6.63225 6.13% 14.9 220s

885401 297624 6.68348 100 102 7.06540 6.63225 6.13% 14.9 225s

904528 304930 6.73381 230 89 7.06540 6.63225 6.13% 14.9 230s

926352 313552 6.69768 97 98 7.06540 6.63225 6.13% 14.9 235s

947049 321393 6.99135 163 113 7.06540 6.63225 6.13% 14.9 240s

964630 328357 6.73416 212 81 7.06540 6.63225 6.13% 15.0 245s

983934 335476 6.69178 91 110 7.06540 6.63225 6.13% 15.0 250s

1000805 342008 6.73415 339 46 7.06540 6.63225 6.13% 15.0 255s

1021241 350446 6.73250 249 101 7.06540 6.63225 6.13% 15.1 260s

1040727 357829 6.71016 99 98 7.06540 6.63225 6.13% 15.1 265s

1059622 366062 6.71868 108 99 7.06540 6.63225 6.13% 15.1 270s

1081307 374263 6.65034 86 110 7.06540 6.63225 6.13% 15.1 275s

1102508 382000 infeasible 89 7.06540 6.63225 6.13% 15.1 280s

1124363 390351 6.73284 142 75 7.06540 6.63225 6.13% 15.0 285s

1144817 397622 6.73936 145 100 7.06540 6.63225 6.13% 15.1 290s

1165547 405471 6.65513 91 105 7.06540 6.63225 6.13% 15.1 295s

1184554 411844 cutoff 69 7.06540 6.63225 6.13% 15.1 300s

1206964 419855 cutoff 119 7.06540 6.63225 6.13% 15.0 305s

1231767 429971 6.73399 183 93 7.06540 6.63225 6.13% 15.0 310s

1251090 438671 6.73618 78 115 7.06540 6.63225 6.13% 14.9 315s

1273957 448468 6.63225 71 117 7.06540 6.63225 6.13% 14.9 320s

1296675 458545 7.02261 140 97 7.06540 6.63225 6.13% 14.9 325s

1318452 466556 6.73419 887 55 7.06540 6.63225 6.13% 14.8 330s

1341878 474948 6.73419 1988 55 7.06540 6.63225 6.13% 14.8 335s

1359995 482122 6.73419 2759 55 7.06540 6.63225 6.13% 14.8 340s

1383132 491140 6.73419 3551 55 7.06540 6.63225 6.13% 14.7 345s

H1386025 491950 7.0654039 6.63225 6.13% 14.7 345s

H1387263 487794 7.0653959 6.63225 6.13% 14.7 346s

1407048 496133 cutoff 83 7.06540 6.63225 6.13% 14.7 350s

1430405 506810 6.73415 308 74 7.06540 6.63225 6.13% 14.7 355s

1454030 517536 infeasible 74 7.06540 6.63225 6.13% 14.6 360s

1475215 528677 infeasible 413 7.06540 6.63225 6.13% 14.6 365s

1494225 538735 infeasible 586 7.06540 6.63225 6.13% 14.7 370s

1509979 547061 6.73415 747 56 7.06540 6.63225 6.13% 14.7 375s

H1519457 550991 7.0653948 6.63225 6.13% 14.8 378s

H1520703 550246 7.0653931 6.63225 6.13% 14.8 378s

1527280 554080 6.73415 927 56 7.06539 6.63225 6.13% 14.8 380s

1538337 559449 6.73415 1055 56 7.06539 6.63225 6.13% 14.9 385s

1556048 567179 6.73415 1259 56 7.06539 6.63225 6.13% 15.0 390s

1573832 575289 6.73415 1466 56 7.06539 6.63225 6.13% 15.1 395s

1586729 582782 6.73415 1585 56 7.06539 6.63225 6.13% 15.1 400s

1603722 591425 6.73415 1735 56 7.06539 6.63225 6.13% 15.1 405s

1621112 601224 6.73415 1909 56 7.06539 6.63225 6.13% 15.2 410s

1637098 608340 6.73415 2106 56 7.06539 6.63225 6.13% 15.3 415s

1654556 615805 6.73415 2296 56 7.06539 6.63225 6.13% 15.4 420s

1668708 623420 6.73415 2465 56 7.06539 6.63225 6.13% 15.5 425s

1685197 631656 6.73415 2649 56 7.06539 6.63225 6.13% 15.6 430s

1703850 640792 6.73415 2821 56 7.06539 6.63225 6.13% 15.6 435s

1719954 649131 6.73415 3017 56 7.06539 6.63225 6.13% 15.7 440s

1740143 659163 6.73415 3203 56 7.06539 6.63225 6.13% 15.7 445s

1760431 669501 6.73415 3409 56 7.06539 6.63225 6.13% 15.8 450s

1784647 680711 6.73415 3590 56 7.06539 6.63225 6.13% 15.8 455s

1806607 689879 infeasible 115 7.06539 6.63225 6.13% 15.8 460s

1828368 700217 6.71067 115 87 7.06539 6.63225 6.13% 15.9 465s

1849159 710684 cutoff 179 7.06539 6.63225 6.13% 15.9 470s

1871421 721455 infeasible 351 7.06539 6.63225 6.13% 15.9 475s

1892861 730553 cutoff 110 7.06539 6.63225 6.13% 15.9 480s

1913184 738917 6.72334 177 98 7.06539 6.63225 6.13% 16.0 485s

1933162 746129 cutoff 139 7.06539 6.63225 6.13% 16.0 490s

1953801 755313 cutoff 162 7.06539 6.63225 6.13% 16.0 495s

1972552 762895 6.71680 141 109 7.06539 6.63225 6.13% 16.0 500s

1992043 772421 6.93919 196 86 7.06539 6.63225 6.13% 16.0 505s

2011209 780822 6.73416 276 86 7.06539 6.63225 6.13% 16.1 510s

H2014852 782534 7.0653931 6.63225 6.13% 16.1 511s

2030292 789780 6.72231 167 96 7.06539 6.63225 6.13% 16.1 515s

2047898 797813 infeasible 144 7.06539 6.63225 6.13% 16.1 520s

2065329 806044 6.73415 239 82 7.06539 6.63225 6.13% 16.1 525s

2080867 811758 infeasible 388 7.06539 6.63225 6.13% 16.2 530s

2095997 817884 6.74724 168 101 7.06539 6.63225 6.13% 16.2 535s

2112605 823646 cutoff 287 7.06539 6.63225 6.13% 16.2 540s

2128443 831018 cutoff 322 7.06539 6.63225 6.13% 16.3 545s

2144037 837406 6.73415 217 89 7.06539 6.63225 6.13% 16.3 550s

2163112 844995 6.73414 212 86 7.06539 6.63225 6.13% 16.3 555s

2179782 851561 6.73416 254 93 7.06539 6.63225 6.13% 16.4 560s

2197253 857578 cutoff 298 7.06539 6.63225 6.13% 16.4 565s

H2206528 861832 7.0653931 6.63225 6.13% 16.4 567s

H2207373 861886 7.0653928 6.63225 6.13% 16.4 567s

2214486 864842 6.70988 115 107 7.06539 6.63225 6.13% 16.4 570s

2227629 870550 6.73419 211 85 7.06539 6.63225 6.13% 16.5 575s

2243513 877789 6.69573 133 102 7.06539 6.63225 6.13% 16.5 580s

2258803 884234 6.72381 122 111 7.06539 6.63225 6.13% 16.6 585s

2272846 890054 6.85519 221 84 7.06539 6.63225 6.13% 16.7 590s

2289064 896940 6.73418 265 106 7.06539 6.63225 6.13% 16.8 595s

2304085 902577 6.73416 236 100 7.06539 6.63225 6.13% 16.9 600s

Explored 2304718 nodes (38844556 simplex iterations) in 600.01 seconds (494.11 work units)

Thread count was 8 (of 8 available processors)

Solution count 10: 7.06539 7.06539 7.06539 ... 7.06541

Time limit reached

Best objective 7.065392759167e+00, best bound 6.632254034635e+00, gap 6.1304%

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 7.06539

Presolve removed 397 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 6.462030e+00, 462 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 6.46203 0 132 7.06539 6.46203 8.54% - 0s

Explored 1 nodes (495 simplex iterations) in 0.95 seconds (0.41 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 7.06539

Optimal solution found (tolerance 2.00e-02)

Best objective 7.065392759167e+00, best bound 7.065392759167e+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: 0xc20a856b

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 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 2.121204e+01, 504 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 - - 0s

0 2 21.21204 0 134 - 21.21204 - - 0s

2216 1004 25.95174 48 0 - 25.95174 - 17.2 5s

H 5615 2060 8280.6796189 25.95174 100% 12.1 6s

14384 8165 25.95174 123 112 8280.67962 25.95174 100% 11.7 11s

\*16499 1226 399 22.9769211 22.97692 0.00% 11.3 11s

Explored 16630 nodes (186976 simplex iterations) in 11.88 seconds (6.47 work units)

Thread count was 8 (of 8 available processors)

Solution count 2: 22.9769 8280.68

Optimal solution found (tolerance 2.00e-02)

Best objective 2.297692110772e+01, best bound 2.297692110772e+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: 0xd45c1bed

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

Loaded MIP start from previous solve with objective 4.76945

Processed MIP start in 1.16 seconds (0.73 work units)

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 3.107992e+00, 494 iterations, 0.02 seconds (0.01 work units)

Nodes | Current Node | Objective Bounds | Work

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

0 0 3.10799 0 133 4.76945 3.10799 34.8% - 1s

0 0 3.10799 0 133 4.76945 3.10799 34.8% - 1s

0 2 3.10799 0 133 4.76945 3.10799 34.8% - 1s

1035 667 3.76424 24 0 4.76945 3.28518 31.1% 19.9 6s

H 1036 634 4.7680441 3.28518 31.1% 19.8 6s

H 2069 855 4.1909788 3.28518 21.6% 16.6 7s

H 2298 636 3.7476813 3.28518 12.3% 16.8 7s

6881 3622 3.68274 369 16 3.74768 3.28518 12.3% 17.7 10s

H 8469 4418 3.7469851 3.28518 12.3% 16.7 10s

H 8636 3300 3.7182130 3.28518 11.6% 17.0 10s

\*12737 2725 887 3.4094878 3.30089 3.19% 15.9 12s

\*13286 2563 545 3.3936602 3.30089 2.73% 15.9 12s

\*13287 2563 546 3.3936602 3.30089 2.73% 15.9 12s

25384 10640 cutoff 598 3.39366 3.30089 2.73% 13.1 15s

43818 19137 cutoff 509 3.39366 3.30089 2.73% 12.0 20s

H51204 22395 3.3936182 3.30089 2.73% 11.8 22s

61748 27844 3.30089 447 69 3.39362 3.30089 2.73% 11.7 25s

82610 38418 3.36576 475 61 3.39362 3.30089 2.73% 11.0 30s

H100559 43657 3.3934374 3.30089 2.73% 10.9 34s

102117 43513 cutoff 814 3.39344 3.30089 2.73% 10.8 35s

H102131 43416 3.3934318 3.30089 2.73% 10.8 35s

118798 51692 3.32879 277 72 3.39343 3.30089 2.73% 11.1 40s

132927 55813 cutoff 119 3.39343 3.30089 2.73% 11.8 45s

147088 61013 3.36132 149 98 3.39343 3.30089 2.73% 12.4 50s

167074 70152 cutoff 456 3.39343 3.30089 2.73% 12.3 55s

187696 80169 cutoff 487 3.39343 3.30089 2.73% 12.2 60s

216962 95297 3.32843 480 53 3.39343 3.30089 2.73% 11.3 65s

248282 109159 3.37802 508 40 3.39343 3.30089 2.73% 10.5 70s

278340 121596 3.31660 461 52 3.39343 3.30089 2.73% 9.8 75s

307252 134156 3.32139 488 48 3.39343 3.30089 2.73% 9.4 80s

332157 145723 3.38524 527 74 3.39343 3.30089 2.73% 9.3 85s

353824 156396 3.30089 616 61 3.39343 3.30089 2.73% 9.6 90s

374292 166848 3.39342 824 52 3.39343 3.30089 2.73% 9.7 95s

394653 176783 3.39258 646 67 3.39343 3.30089 2.73% 9.8 100s

414167 186731 cutoff 578 3.39343 3.30089 2.73% 9.8 105s

H429659 194434 3.3934318 3.30089 2.73% 9.8 108s

H431465 192649 3.3934189 3.30089 2.73% 9.8 109s

436253 194982 3.39054 513 69 3.39342 3.30089 2.73% 9.8 110s

460424 206228 infeasible 730 3.39342 3.30089 2.73% 9.8 115s

483301 216597 cutoff 627 3.39342 3.30089 2.73% 9.7 120s

507071 229539 3.38414 605 63 3.39342 3.30089 2.73% 9.6 125s

H508050 229539 3.3934189 3.30089 2.73% 9.6 125s

H508163 230094 3.3934188 3.30089 2.73% 9.6 125s

528850 241074 3.39137 594 71 3.39342 3.30089 2.73% 9.6 130s

550846 252867 3.30766 466 71 3.39342 3.30089 2.73% 9.5 135s

574641 266130 3.31513 498 65 3.39342 3.30089 2.73% 9.4 140s

600934 278409 infeasible 693 3.39342 3.30089 2.73% 9.2 145s

628265 290920 cutoff 659 3.39342 3.30089 2.73% 9.1 150s

652897 303138 cutoff 537 3.39342 3.30089 2.73% 9.0 155s

677958 314930 3.35030 572 39 3.39342 3.30089 2.73% 8.9 160s

701838 323741 3.31803 621 65 3.39342 3.30089 2.73% 8.9 165s

725725 331764 infeasible 596 3.39342 3.30089 2.73% 8.9 170s

747953 340237 3.38777 610 57 3.39342 3.30089 2.73% 8.9 175s

771204 349622 infeasible 698 3.39342 3.30089 2.73% 8.9 180s

800114 361827 3.30089 662 61 3.39342 3.30089 2.73% 8.8 185s

824508 373301 infeasible 666 3.39342 3.30089 2.73% 8.7 190s

848822 383353 3.36142 672 38 3.39342 3.30089 2.73% 8.7 195s

871893 393449 infeasible 666 3.39342 3.30089 2.73% 8.7 200s

896562 402798 infeasible 641 3.39342 3.30089 2.73% 8.7 205s

919926 410882 3.30089 266 77 3.39342 3.30089 2.73% 8.7 210s

942767 417346 3.38723 280 60 3.39342 3.30089 2.73% 8.8 215s

967393 427186 3.39205 766 56 3.39342 3.30089 2.73% 8.7 220s

996591 437129 3.32778 634 57 3.39342 3.30089 2.73% 8.6 225s

1023502 448756 3.37120 694 53 3.39342 3.30089 2.73% 8.6 230s

1050902 460693 3.38820 649 65 3.39342 3.30089 2.73% 8.5 235s

1079753 473345 3.38458 650 60 3.39342 3.30089 2.73% 8.4 240s

1108952 486207 3.31805 684 62 3.39342 3.30089 2.73% 8.3 245s

1135421 497435 cutoff 608 3.39342 3.30089 2.73% 8.3 250s

1160961 509044 3.38076 628 55 3.39342 3.30089 2.73% 8.2 255s

1187518 520205 3.31613 610 57 3.39342 3.30089 2.73% 8.2 260s

1215672 531396 cutoff 670 3.39342 3.30089 2.73% 8.1 265s

1242126 542802 3.31966 684 52 3.39342 3.30089 2.73% 8.1 270s

1269862 553810 infeasible 681 3.39342 3.30089 2.73% 8.1 275s

1296541 564016 3.38094 677 43 3.39342 3.30089 2.73% 8.0 280s

1324955 575946 3.31339 662 53 3.39342 3.30089 2.73% 8.0 285s

1352218 587225 3.31613 631 56 3.39342 3.30089 2.73% 7.9 290s

1377371 596619 3.30089 659 54 3.39342 3.30089 2.73% 8.0 295s

1401499 606714 3.31797 629 64 3.39342 3.30089 2.73% 8.0 300s

1424423 616282 3.31804 643 58 3.39342 3.30089 2.73% 8.0 305s

1447459 625937 infeasible 645 3.39342 3.30089 2.73% 8.0 310s

1472429 635797 3.35675 673 60 3.39342 3.30089 2.73% 8.0 315s

1496651 646092 cutoff 621 3.39342 3.30089 2.73% 8.1 320s

1518175 655480 infeasible 710 3.39342 3.30089 2.73% 8.1 325s

1539140 665217 3.30089 587 65 3.39342 3.30089 2.73% 8.1 330s

1561334 674866 infeasible 667 3.39342 3.30089 2.73% 8.1 335s

1585030 684592 3.39329 664 24 3.39342 3.30089 2.73% 8.1 340s

1608405 694571 3.33992 629 63 3.39342 3.30089 2.73% 8.1 345s

1633232 705067 infeasible 686 3.39342 3.30089 2.73% 8.0 350s

1658152 715820 3.32585 677 34 3.39342 3.30089 2.73% 8.0 355s

1678178 728384 3.34686 454 60 3.39342 3.30089 2.73% 8.1 360s

1702867 749247 3.34686 2945 60 3.39342 3.30089 2.73% 8.1 365s

1719413 756755 3.30089 3656 57 3.39342 3.30089 2.73% 8.2 370s

1735922 761906 3.39342 1395 41 3.39342 3.30089 2.73% 8.3 375s

1763729 766600 3.30089 3850 67 3.39342 3.30089 2.73% 8.2 380s

1782341 770475 3.39291 3672 51 3.39342 3.30089 2.73% 8.4 385s

1799791 775180 cutoff 3935 3.39342 3.30089 2.73% 8.5 390s

1816819 784581 3.35143 1785 36 3.39342 3.30089 2.73% 8.5 395s

1834211 792617 3.30089 615 66 3.39342 3.30089 2.73% 8.6 400s

1858560 795303 cutoff 171 3.39342 3.30089 2.73% 8.5 405s

1888557 798144 3.38238 414 69 3.39342 3.30089 2.73% 8.5 410s

1908315 804354 3.38517 228 78 3.39342 3.30089 2.73% 8.5 415s

1929484 810997 cutoff 3264 3.39342 3.30089 2.73% 8.5 420s

1952027 818905 3.39213 3640 45 3.39342 3.30089 2.73% 8.5 425s

1972756 825532 cutoff 3901 3.39342 3.30089 2.73% 8.5 430s

1996339 833145 3.39319 563 67 3.39342 3.30089 2.73% 8.4 435s

2022942 844988 3.31880 490 55 3.39342 3.30089 2.73% 8.4 440s

2043916 854845 cutoff 509 3.39342 3.30089 2.73% 8.4 445s

2067296 865366 3.38094 556 37 3.39342 3.30089 2.73% 8.4 450s

2092417 874664 cutoff 553 3.39342 3.30089 2.73% 8.3 455s

2119122 884702 3.30089 607 64 3.39342 3.30089 2.73% 8.3 460s

2138350 892119 3.34011 568 45 3.39342 3.30089 2.73% 8.3 465s

2158143 900169 3.31311 543 53 3.39342 3.30089 2.73% 8.4 470s

2173441 906608 3.36984 571 44 3.39342 3.30089 2.73% 8.5 475s

2189539 914091 cutoff 602 3.39342 3.30089 2.73% 8.7 480s

2209862 924258 3.36643 661 69 3.39342 3.30089 2.73% 8.7 485s

2231560 937041 cutoff 495 3.39342 3.30089 2.73% 8.8 490s

2255125 949111 3.37819 549 46 3.39342 3.30089 2.73% 8.8 495s

2280212 962675 3.38462 568 41 3.39342 3.30089 2.73% 8.8 500s

2304549 974867 3.39222 575 52 3.39342 3.30089 2.73% 8.7 505s

2325408 983217 3.35731 446 62 3.39342 3.30089 2.73% 8.8 510s

2347775 992070 3.37171 450 58 3.39342 3.30089 2.73% 8.8 515s

2367451 998894 cutoff 436 3.39342 3.30089 2.73% 8.8 520s

2388792 1002544 infeasible 484 3.39342 3.30089 2.73% 8.9 525s

2412316 1009392 3.30089 443 73 3.39342 3.30089 2.73% 8.9 530s

2438466 1017710 3.37700 508 52 3.39342 3.30089 2.73% 8.9 535s

2468903 1025390 infeasible 498 3.39342 3.30089 2.73% 8.9 540s

2494897 1032004 3.34854 511 56 3.39342 3.30089 2.73% 8.9 545s

2523607 1040424 3.32185 482 69 3.39342 3.30089 2.73% 8.9 550s

2553061 1049756 3.39327 567 69 3.39342 3.30089 2.73% 8.9 555s

2580566 1061059 3.39211 544 55 3.39342 3.30089 2.73% 8.8 560s

2602608 1072034 3.38911 615 58 3.39342 3.30089 2.73% 8.9 565s

2627128 1082504 cutoff 635 3.39342 3.30089 2.73% 8.9 570s

2650976 1092807 3.39331 656 60 3.39342 3.30089 2.73% 8.9 575s

2675060 1103106 3.36108 639 44 3.39342 3.30089 2.73% 8.9 580s

2697755 1113227 3.39285 665 44 3.39342 3.30089 2.73% 8.9 585s

2718497 1122612 3.31474 606 44 3.39342 3.30089 2.73% 8.9 590s

2742394 1132892 cutoff 638 3.39342 3.30089 2.73% 8.9 595s

2767016 1143414 3.38469 575 36 3.39342 3.30089 2.73% 8.9 600s

Explored 2768363 nodes (24635014 simplex iterations) in 600.01 seconds (355.78 work units)

Thread count was 8 (of 8 available processors)

Solution count 10: 3.39342 3.39342 3.39342 ... 3.40949

Time limit reached

Best objective 3.393418790420e+00, best bound 3.300886144590e+00, gap 2.7268%

Optimize failed at lambda = 0.0025 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: 0xf7f15d80

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 5.6659

Presolve removed 64 rows and 134 columns

Presolve time: 0.02s

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 5.354950e+00, 497 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 5.35495 0 134 5.66590 5.35495 5.49% - 0s

0 0 5.35495 0 134 5.66590 5.35495 5.49% - 1s

H 0 0 5.6658846 5.35495 5.49% - 1s

0 2 5.35495 0 134 5.66588 5.35495 5.49% - 1s

2233 1109 5.61862 43 0 5.66588 5.45877 3.66% 26.9 5s

18397 8658 5.59371 332 73 5.66588 5.45877 3.66% 13.3 10s

H31438 13049 5.6658846 5.45877 3.66% 11.5 13s

H32889 13266 5.6658846 5.45877 3.66% 11.3 13s

36705 15125 5.45877 81 101 5.66588 5.45877 3.66% 11.8 15s

54092 22897 infeasible 74 5.66588 5.45877 3.66% 12.9 20s

71972 29124 cutoff 103 5.66588 5.45877 3.66% 13.5 25s

90244 35689 infeasible 91 5.66588 5.45877 3.66% 13.7 30s

107550 42303 cutoff 112 5.66588 5.45877 3.66% 14.0 35s

121525 46276 infeasible 94 5.66588 5.45877 3.66% 14.6 40s

139004 51460 5.45877 103 102 5.66588 5.45877 3.66% 14.9 45s

155522 55905 5.45877 116 93 5.66588 5.45877 3.66% 15.3 50s

172405 61208 5.45877 127 94 5.66588 5.45877 3.66% 15.6 55s

189263 67156 infeasible 123 5.66588 5.45877 3.66% 15.8 60s

204413 72678 5.64857 864 42 5.66588 5.45877 3.66% 15.8 65s

219935 79186 5.64857 3138 42 5.66588 5.45877 3.66% 15.8 70s

235645 85082 5.60850 136 119 5.66588 5.45877 3.66% 15.9 75s

253124 90247 5.58130 97 122 5.66588 5.45877 3.66% 16.2 80s

270077 95784 cutoff 119 5.66588 5.45877 3.66% 16.4 85s

284779 99881 5.62723 124 100 5.66588 5.45877 3.66% 16.7 90s

301825 105103 5.51896 84 115 5.66588 5.45877 3.66% 17.0 95s

317109 109684 5.47849 113 105 5.66588 5.45877 3.66% 17.2 100s

333377 114300 5.45877 121 114 5.66588 5.45877 3.66% 17.4 105s

350267 120016 5.45938 113 108 5.66588 5.45877 3.66% 17.6 110s

367959 126169 infeasible 114 5.66588 5.45877 3.66% 17.6 115s

383797 130941 cutoff 136 5.66588 5.45877 3.66% 17.7 120s

400713 136316 cutoff 161 5.66588 5.45877 3.66% 17.8 125s

417720 141494 5.66013 206 90 5.66588 5.45877 3.66% 17.9 130s

433220 146372 5.62232 102 112 5.66588 5.45877 3.66% 18.0 135s

449545 151368 cutoff 114 5.66588 5.45877 3.66% 18.1 140s

467124 157166 5.45877 84 110 5.66588 5.45877 3.66% 18.2 145s

482453 160997 5.66309 129 108 5.66588 5.45877 3.66% 18.4 150s

498443 165933 5.45877 91 100 5.66588 5.45877 3.66% 18.5 155s

515554 171369 5.46932 96 110 5.66588 5.45877 3.66% 18.5 160s

532271 175502 5.45877 62 117 5.66588 5.45877 3.66% 18.6 165s

549581 181922 5.55777 105 108 5.66588 5.45877 3.66% 18.6 170s

566000 186768 5.56589 110 109 5.66588 5.45877 3.66% 18.7 175s

581369 190905 5.45877 95 110 5.66588 5.45877 3.66% 18.6 180s

600074 196626 5.45877 67 109 5.66588 5.45877 3.66% 18.6 185s

617537 200955 5.58474 126 100 5.66588 5.45877 3.66% 18.7 190s

636849 211665 5.63119 2059 62 5.66588 5.45877 3.66% 18.4 195s

656364 223109 5.64727 120 102 5.66588 5.45877 3.66% 18.2 200s

674862 228126 5.53619 77 111 5.66588 5.45877 3.66% 18.2 205s

692754 233837 5.62126 146 116 5.66588 5.45877 3.66% 18.3 210s

709438 238049 5.66432 113 111 5.66588 5.45877 3.66% 18.2 215s

727670 242483 5.64281 172 108 5.66588 5.45877 3.66% 18.2 220s

744368 248369 5.63992 323 89 5.66588 5.45877 3.66% 18.2 225s

763293 255572 5.45877 129 96 5.66588 5.45877 3.66% 18.1 230s

781498 260093 5.58618 155 104 5.66588 5.45877 3.66% 18.1 235s

799270 264422 infeasible 110 5.66588 5.45877 3.66% 18.1 240s

817468 269441 5.45877 124 98 5.66588 5.45877 3.66% 18.1 245s

834833 274871 cutoff 202 5.66588 5.45877 3.66% 18.1 250s

853158 279295 5.66578 259 87 5.66588 5.45877 3.66% 18.1 255s

872323 283955 5.64652 128 119 5.66588 5.45877 3.66% 18.1 260s

891282 289813 5.66501 219 99 5.66588 5.45877 3.66% 18.1 265s

909173 294262 5.54494 93 102 5.66588 5.45877 3.66% 18.1 270s

925522 298572 5.45877 101 101 5.66588 5.45877 3.66% 18.1 275s

943367 303238 5.45877 66 118 5.66588 5.45877 3.66% 18.2 280s

960423 307546 cutoff 106 5.66588 5.45877 3.66% 18.2 285s

978658 313661 5.45877 110 106 5.66588 5.45877 3.66% 18.2 290s

996278 316818 cutoff 339 5.66588 5.45877 3.66% 18.1 295s

1014883 321719 5.45877 182 98 5.66588 5.45877 3.66% 18.1 300s

1033716 326569 cutoff 122 5.66588 5.45877 3.66% 18.1 305s

1049839 331384 5.66514 105 103 5.66588 5.45877 3.66% 18.1 310s

1068225 336195 5.66569 123 96 5.66588 5.45877 3.66% 18.1 315s

1084127 340535 infeasible 81 5.66588 5.45877 3.66% 18.1 320s

1103439 346092 5.59212 138 103 5.66588 5.45877 3.66% 18.1 325s

1121928 349987 cutoff 123 5.66588 5.45877 3.66% 18.0 330s

1140273 356358 5.45877 82 110 5.66588 5.45877 3.66% 18.0 335s

1158194 362487 5.66293 145 116 5.66588 5.45877 3.66% 18.0 340s

1174137 366458 5.45877 118 95 5.66588 5.45877 3.66% 18.1 345s

1191593 372654 5.45877 86 106 5.66588 5.45877 3.66% 18.1 350s

1209819 380488 infeasible 152 5.66588 5.45877 3.66% 18.0 355s

1228283 386914 cutoff 121 5.66588 5.45877 3.66% 18.0 360s

1246319 392600 5.61481 95 101 5.66588 5.45877 3.66% 18.0 365s

1264028 398003 cutoff 135 5.66588 5.45877 3.66% 18.1 370s

1281522 403249 5.45877 57 124 5.66588 5.45877 3.66% 18.1 375s

1299666 409309 cutoff 150 5.66588 5.45877 3.66% 18.1 380s

1317785 415627 5.45877 49 123 5.66588 5.45877 3.66% 18.1 385s

1336930 421193 5.45877 51 121 5.66588 5.45877 3.66% 18.1 390s

1355568 426030 cutoff 1318 5.66588 5.45877 3.66% 18.0 395s

1374872 433360 cutoff 56 5.66588 5.45877 3.66% 17.9 400s

1392730 439100 infeasible 71 5.66588 5.45877 3.66% 18.0 405s

1412216 448592 5.62208 2314 37 5.66588 5.45877 3.66% 17.9 410s

1429340 456203 5.55464 85 108 5.66588 5.45877 3.66% 17.9 415s

1445642 463384 5.65584 307 69 5.66588 5.45877 3.66% 17.8 420s

1463464 472689 infeasible 112 5.66588 5.45877 3.66% 17.8 425s

1484718 480026 5.45877 77 103 5.66588 5.45877 3.66% 17.7 430s

1503761 486161 5.45877 86 102 5.66588 5.45877 3.66% 17.8 435s

1524197 492597 5.66341 202 96 5.66588 5.45877 3.66% 17.7 440s

1543934 500610 5.61736 106 112 5.66588 5.45877 3.66% 17.6 445s

1560676 504569 5.45877 85 98 5.66588 5.45877 3.66% 17.6 450s

1579378 512533 5.65799 152 99 5.66588 5.45877 3.66% 17.6 455s

1599604 519809 5.46488 97 111 5.66588 5.45877 3.66% 17.5 460s

1619056 526794 5.65292 82 105 5.66588 5.45877 3.66% 17.5 465s

1638038 533244 5.45877 75 112 5.66588 5.45877 3.66% 17.5 470s

1656918 540094 5.59900 131 107 5.66588 5.45877 3.66% 17.5 475s

1673207 544615 5.63561 100 93 5.66588 5.45877 3.66% 17.6 480s

1692421 548383 5.65941 644 59 5.66588 5.45877 3.66% 17.5 485s

1717380 559241 5.65941 2885 59 5.66588 5.45877 3.66% 17.4 490s

1739596 568100 5.65208 298 41 5.66588 5.45877 3.66% 17.3 495s

1759498 573813 5.62201 173 86 5.66588 5.45877 3.66% 17.3 500s

1778641 579357 5.45877 83 97 5.66588 5.45877 3.66% 17.2 505s

1796293 585054 5.66445 264 96 5.66588 5.45877 3.66% 17.2 510s

1813181 588666 5.61183 240 64 5.66588 5.45877 3.66% 17.2 515s

1829789 595825 infeasible 127 5.66588 5.45877 3.66% 17.2 520s

1846935 601021 5.66551 139 95 5.66588 5.45877 3.66% 17.2 525s

1864513 607574 5.65924 624 33 5.66588 5.45877 3.66% 17.2 530s

1880366 615008 5.65924 1171 33 5.66588 5.45877 3.66% 17.2 535s

1897101 620872 5.65924 1773 33 5.66588 5.45877 3.66% 17.2 540s

1913530 625556 infeasible 2523 5.66588 5.45877 3.66% 17.2 545s

1931366 633786 5.65924 3354 33 5.66588 5.45877 3.66% 17.2 550s

1951716 642255 5.63110 138 84 5.66588 5.45877 3.66% 17.2 555s

1971399 649936 5.55889 105 107 5.66588 5.45877 3.66% 17.2 560s

1992476 656679 5.65896 174 95 5.66588 5.45877 3.66% 17.1 565s

2010913 662515 5.61410 343 66 5.66588 5.45877 3.66% 17.1 570s

2025323 668019 5.66123 116 114 5.66588 5.45877 3.66% 17.2 575s

2042194 675224 5.45877 96 110 5.66588 5.45877 3.66% 17.2 580s

2058360 678647 5.63716 101 93 5.66588 5.45877 3.66% 17.2 585s

2074500 681965 5.60584 198 91 5.66588 5.45877 3.66% 17.3 590s

2091531 685648 cutoff 135 5.66588 5.45877 3.66% 17.3 595s

2111700 694378 cutoff 140 5.66588 5.45877 3.66% 17.3 600s

Explored 2112100 nodes (36451875 simplex iterations) in 600.01 seconds (513.87 work units)

Thread count was 8 (of 8 available processors)

Solution count 4: 5.66588 5.66588 5.66588 5.6659

Time limit reached

Best objective 5.665884575543e+00, best bound 5.458770046682e+00, gap 3.6555%

Optimize failed at lambda = 0.007134999999999999 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: 0x97de8511

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 4.79808

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 4.500930e+00, 488 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 4.50093 0 134 4.79808 4.50093 6.19% - 0s

0 0 cutoff 0 4.79808 4.79808 0.00% - 0s

Explored 1 nodes (504 simplex iterations) in 0.73 seconds (0.40 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 4.79808

Optimal solution found (tolerance 2.00e-02)

Best objective 4.798075783994e+00, best bound 4.798075783994e+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

Presolve removed 64 rows and 134 columns

Presolve time: 0.02s

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 3.970055e+00, 488 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 3.97005 0 133 4.26149 3.97005 6.84% - 0s

Explored 1 nodes (488 simplex iterations) in 0.84 seconds (0.63 work units)

Thread count was 8 (of 8 available processors)

Solution count 1: 4.26149

Optimal solution found (tolerance 2.00e-02)

Best objective 4.261490486969e+00, best bound 4.261490486969e+00, gap 0.0000%

QP count: 7 Infeas count: 0

PS C:\Users\Martonosi\Dropbox\research\COVID-19 Vaccine Distribution\international-vaccine-allocation>