Table 1 – Execution Time × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Execution Time | Interior Points Execution Time | Hybrid Execution Time |
| 2.0 | 0.0 | 0.0022 | 0.0027 |
| 4.0 | 0.0 | 0.0026 | 0.0028 |
| 6.0 | 0.0 | 0.0029 | 0.003 |
| 10.0 | 0.0 | 0.0033 | 0.0035 |
| 14.0 | 0.0 | 0.0455 | 0.0475 |
| 18.0 | 0.0 | 0.0942 | 0.1003 |
| 20.0 | 0.0 | 0.1223 | 0.1248 |
| 22.0 | 0.0 | 0.1649 | 0.1649 |
| 24.0 | 0.0 | 0.2071 | 0.2074 |
| 26.0 | 0.0 | 0.2581 | 0.2598 |

Table 2 – Number of iterations × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Iterations | Interior Points Iterations | Hybrid Iterations |
| 2.0 | 0.0 | 35.0 | 36.0 |
| 4.0 | 0.0 | 36.0 | 37.0 |
| 6.0 | 0.0 | 36.0 | 37.0 |
| 10.0 | 0.0 | 36.0 | 37.0 |
| 14.0 | 0.0 | 36.0 | 37.0 |
| 18.0 | 0.0 | 36.0 | 37.0 |
| 20.0 | 0.0 | 36.0 | 37.0 |
| 22.0 | 0.0 | 36.0 | 37.0 |
| 24.0 | 0.0 | 36.0 | 37.0 |
| 26.0 | 0.0 | 36.0 | 37.0 |

Table 3 – Objective Function Error × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Objective Funcion Error (%) | Interior Points Objective Funcion Error (%) | Hybrid Objective Funcion Error (%) |
| 2.0 | 0.0 | 5.820780302201456e-09 | 0.0 |
| 4.0 | 0.0 | 5.659891758114099e-09 | 0.0 |
| 6.0 | 0.0 | 5.661125183105468e-09 | 0.0 |
| 10.0 | 0.0 | 5.6606336e-09 | 0.0 |
| 14.0 | 0.0 | 5.660457658482688e-09 | 0.0 |
| 18.0 | 0.0 | 5.660729295469159e-09 | 0.0 |
| 20.0 | 0.0 | 5.660757371413638e-09 | 0.0 |
| 22.0 | 0.0 | 5.661068851151061e-09 | 0.0 |
| 24.0 | 0.0 | 5.660402195681106e-09 | 0.0 |
| 26.0 | 0.0 | 5.660787419486708e-09 | 0.0 |

Table 4 – Solution Error × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Solution Error (%) | Interior Points Solution Error (%) | Hybrid Solution Error (%) |
| 2.0 | 0.0 | 8.731163347874826e-09 | 0.0 |
| 4.0 | 0.0 | 9.864591993391513e-09 | 0.0 |
| 6.0 | 0.0 | 9.867038726806641e-09 | 0.0 |
| 10.0 | 0.0 | 9.8660736e-09 | 0.0 |
| 14.0 | 0.0 | 9.865728857473024e-09 | 0.0 |
| 18.0 | 0.0 | 9.866264126253646e-09 | 0.0 |
| 20.0 | 0.0 | 9.866345845329893e-09 | 0.0 |
| 22.0 | 0.0 | 9.86695466037265e-09 | 0.0 |
| 24.0 | 0.0 | 9.865617561336218e-09 | 0.0 |
| 26.0 | 0.0 | 9.866381721400444e-09 | 0.0 |

Table 5 – Step (Alpha) x Execution Time - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Exec Time n=2 | Exec Time n=6 | Exec Time n=10 | Exec Time n=14 | Exec Time n=18 | Exec Time n=22 | Exec Time n=26 |
| 0.01 | 0.1546 | 0.188 | 0.2139 | 3.0806 | 6.1871 | 10.918 | 17.7264 |
| 0.05 | 0.0317 | 0.037 | 0.0413 | 0.6042 | 1.2099 | 2.1412 | 3.4546 |
| 0.1 | 0.0154 | 0.0174 | 0.0208 | 0.3018 | 0.5931 | 1.0471 | 1.6829 |
| 0.3 | 0.0047 | 0.0053 | 0.006 | 0.0881 | 0.1805 | 0.3134 | 0.5026 |
| 0.5 | 0.0031 | 0.0028 | 0.0031 | 0.0452 | 0.0914 | 0.1582 | 0.261 |
| 0.7 | 0.0014 | 0.0017 | 0.0024 | 0.0271 | 0.0554 | 0.1007 | 0.157 |
| 0.8 | 0.002 | 0.0016 | 0.0017 | 0.0237 | 0.049 | 0.0826 | 0.1342 |
| 0.9 | 0.0016 | 0.0013 | 0.0014 | 0.0197 | 0.039 | 0.0688 | 0.1138 |
| 0.95 | 0.0011 | 0.001 | 0.0011 | 0.0174 | 0.035 | 0.0616 | 0.0983 |
| 0.99 | 0.0007 | 0.001 | 0.001 | 0.0143 | 0.027 | 0.0467 | 0.0789 |

Table 6 – Step (Alpha) x Iterations - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Iterations n=2 | Iterations n=6 | Iterations n=10 | Iterations n=14 | Iterations n=18 | Iterations n=22 | Iterations n=26 |
| 0.01 | 2361.0 | 2401.0 | 2401.0 | 2401.0 | 2401.0 | 2401.0 | 2401.0 |
| 0.05 | 463.0 | 471.0 | 471.0 | 471.0 | 471.0 | 471.0 | 471.0 |
| 0.1 | 226.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 |
| 0.3 | 67.0 | 69.0 | 69.0 | 69.0 | 69.0 | 69.0 | 69.0 |
| 0.5 | 35.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| 0.7 | 21.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| 0.8 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| 0.9 | 15.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| 0.95 | 13.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| 0.99 | 9.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |

Table 7 – Step (Alpha) x Objective Function Error (%) - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Objective Function Error (%) n=2 | Objective Function Error (%) n=6 | Objective Function Error (%) n=10 | Objective Function Error (%) n=14 | Objective Function Error (%) n=18 | Objective Function Error (%) n=22 | Objective Function Error (%) n=26 |
| 0.01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.05 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.95 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.99 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 8 – Step (Alpha) x Solution Error (%) - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Solution Error (%) n=2 | Solution Error (%) n=6 | Solution Error (%) n=10 | Solution Error (%) n=14 | Solution Error (%) n=18 | Solution Error (%) n=22 | Solution Error (%) n=26 |
| 0.01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.05 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.95 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.99 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 9 – Step (Alpha) x Execution Time - Hybrid Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Exec Time n=2 | Exec Time n=6 | Exec Time n=10 | Exec Time n=14 | Exec Time n=18 | Exec Time n=22 | Exec Time n=26 |
| 0.01 | 0.157 | 0.1864 | 0.2144 | 3.096 | 6.1529 | 10.9327 | 17.6773 |
| 0.05 | 0.0316 | 0.0366 | 0.0412 | 0.6162 | 1.2106 | 2.1315 | 3.4724 |
| 0.1 | 0.0153 | 0.0176 | 0.0203 | 0.2933 | 0.588 | 1.0388 | 1.6855 |
| 0.3 | 0.0049 | 0.0057 | 0.0063 | 0.0912 | 0.1764 | 0.3177 | 0.5051 |
| 0.5 | 0.0031 | 0.0029 | 0.0034 | 0.0452 | 0.0905 | 0.1611 | 0.2647 |
| 0.7 | 0.0017 | 0.002 | 0.003 | 0.0272 | 0.0549 | 0.0989 | 0.1574 |
| 0.8 | 0.0027 | 0.0016 | 0.0021 | 0.0247 | 0.0487 | 0.0828 | 0.1352 |
| 0.9 | 0.002 | 0.0014 | 0.0017 | 0.0197 | 0.0408 | 0.0712 | 0.1132 |
| 0.95 | 0.0011 | 0.0014 | 0.0017 | 0.0175 | 0.0353 | 0.0609 | 0.0988 |
| 0.99 | 0.0008 | 0.001 | 0.0012 | 0.0136 | 0.0269 | 0.0476 | 0.0756 |

Table 10 – Step (Alpha) x Iterations - Hybrid Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Iterations n=2 | Iterations n=6 | Iterations n=10 | Iterations n=14 | Iterations n=18 | Iterations n=22 | Iterations n=26 |
| 0.01 | 2362.0 | 2402.0 | 2402.0 | 2402.0 | 2402.0 | 2402.0 | 2402.0 |
| 0.05 | 464.0 | 472.0 | 472.0 | 472.0 | 472.0 | 472.0 | 472.0 |
| 0.1 | 227.0 | 231.0 | 231.0 | 231.0 | 231.0 | 231.0 | 231.0 |
| 0.3 | 68.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 |
| 0.5 | 36.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 |
| 0.7 | 22.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 0.8 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| 0.9 | 16.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 |
| 0.95 | 14.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| 0.99 | 10.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |

Table 11 – Gap x Execution Time - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Exec Time n=2 | Exec Time n=6 | Exec Time n=10 | Exec Time n=14 | Exec Time n=18 | Exec Time n=22 | Exec Time n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 12 – Gap x Iterations - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Iterations n=2 | Iterations n=6 | Iterations n=10 | Iterations n=14 | Iterations n=18 | Iterations n=22 | Iterations n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 13 – Gap x Objective Function Error (%) - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Objective Function Error (%) n=2 | Objective Function Error (%) n=6 | Objective Function Error (%) n=10 | Objective Function Error (%) n=14 | Objective Function Error (%) n=18 | Objective Function Error (%) n=22 | Objective Function Error (%) n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 14 – Gap x Solution Error (%) - Interior Point Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Solution Error (%) n=2 | Solution Error (%) n=6 | Solution Error (%) n=10 | Solution Error (%) n=14 | Solution Error (%) n=18 | Solution Error (%) n=22 | Solution Error (%) n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 15 – Gap x Execution Time - Hybrid Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Exec Time n=2 | Exec Time n=6 | Exec Time n=10 | Exec Time n=14 | Exec Time n=18 | Exec Time n=22 | Exec Time n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Table 16 – Gap x Iterations - Hybrid Algorithm

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gap | Iterations n=2 | Iterations n=6 | Iterations n=10 | Iterations n=14 | Iterations n=18 | Iterations n=22 | Iterations n=26 |
| 1e-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1e-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |