Table 1 – Execution Time × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Execution Time | Interior Points Execution Time | Hybrid Execution Time |
| 2.0 | 0.0 | 0.0002 | 0.0005 |
| 4.0 | 0.0 | 0.0002 | 0.0004 |
| 6.0 | 0.0 | 0.0002 | 0.0004 |
| 10.0 | 0.0 | 0.0002 | 0.0004 |
| 14.0 | 0.0 | 0.002 | 0.0024 |
| 18.0 | 0.0 | 0.004 | 0.0042 |
| 20.0 | 0.0 | 0.0055 | 0.0055 |
| 22.0 | 0.0 | 0.007 | 0.0073 |
| 24.0 | 0.0 | 0.0091 | 0.0093 |
| 26.0 | 0.0 | 0.0115 | 0.0122 |

Table 2 – Number of iterations × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Iterations | Interior Points Iterations | Hybrid Iterations |
| 2.0 | 0.0 | 3.0 | 4.0 |
| 4.0 | 0.0 | 2.0 | 4.0 |
| 6.0 | 0.0 | 2.0 | 3.0 |
| 10.0 | 0.0 | 2.0 | 3.0 |
| 14.0 | 0.0 | 2.0 | 3.0 |
| 18.0 | 0.0 | 2.0 | 3.0 |
| 20.0 | 0.0 | 2.0 | 3.0 |
| 22.0 | 0.0 | 2.0 | 3.0 |
| 24.0 | 0.0 | 2.0 | 3.0 |
| 26.0 | 0.0 | 2.0 | 3.0 |

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 | 0.249992632 | 0.0 |
| 4.0 | 0.0 | 0.287711761 | 0.0 |
| 6.0 | 0.0 | 0.287711764 | 0.0 |
| 10.0 | 0.0 | 0.287711755 | 0.0 |
| 14.0 | 0.0 | 0.287711758 | 0.0 |
| 18.0 | 0.0 | 0.287711751 | 0.0 |
| 20.0 | 0.0 | 0.287711751 | 0.0 |
| 22.0 | 0.0 | 0.287711761 | 0.0 |
| 24.0 | 0.0 | 0.28771175 | 0.0 |
| 26.0 | 0.0 | 0.287711754 | 0.0 |

Table 4 – Solution Error × Problem Dimension

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Simplex Solution Error (%) | Interior Points Solution Error (%) | Hybrid Solution Error (%) |
| 2.0 | 0.0 | 0.250012145 | 0.0 |
| 4.0 | 0.0 | 0.325423524 | 0.0 |
| 6.0 | 0.0 | 0.32542353 | 0.0 |
| 10.0 | 0.0 | 0.325423511 | 0.0 |
| 14.0 | 0.0 | 0.325423517 | 0.0 |
| 18.0 | 0.0 | 0.325423504 | 0.0 |
| 20.0 | 0.0 | 0.325423502 | 0.0 |
| 22.0 | 0.0 | 0.325423524 | 0.0 |
| 24.0 | 0.0 | 0.3254235 | 0.0 |
| 26.0 | 0.0 | 0.325423509 | 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 | 0.1743 | 0.1914 | 0.2217 | 3.1819 | 6.3268 | 11.2535 | 18.3085 |
| 0.05 | 0.0329 | 0.038 | 0.0441 | 0.6204 | 1.2395 | 2.2022 | 3.6867 |
| 0.1 | 0.0153 | 0.0183 | 0.0206 | 0.2977 | 0.6076 | 1.0752 | 1.8042 |
| 0.3 | 0.0043 | 0.0061 | 0.0072 | 0.0918 | 0.1836 | 0.3241 | 0.5311 |
| 0.5 | 0.0025 | 0.0028 | 0.0036 | 0.0481 | 0.0934 | 0.1672 | 0.2677 |
| 0.7 | 0.0011 | 0.0017 | 0.0023 | 0.0274 | 0.0583 | 0.0997 | 0.1663 |
| 0.8 | 0.0014 | 0.0015 | 0.0016 | 0.0241 | 0.0483 | 0.0856 | 0.1426 |
| 0.9 | 0.001 | 0.0013 | 0.0014 | 0.0202 | 0.0398 | 0.0714 | 0.1192 |
| 0.95 | 0.001 | 0.0014 | 0.0014 | 0.0179 | 0.0368 | 0.065 | 0.1026 |
| 0.99 | 0.0005 | 0.0003 | 0.0011 | 0.0143 | 0.0275 | 0.0478 | 0.081 |

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 | 0.1656 | 0.1908 | 0.2185 | 3.1859 | 6.3197 | 11.2315 | 18.3362 |
| 0.05 | 0.0316 | 0.0399 | 0.0436 | 0.6171 | 1.2366 | 2.1838 | 3.7098 |
| 0.1 | 0.0159 | 0.0181 | 0.0215 | 0.3054 | 0.5987 | 1.0741 | 1.8032 |
| 0.3 | 0.0048 | 0.006 | 0.0079 | 0.0924 | 0.1796 | 0.3225 | 0.522 |
| 0.5 | 0.0025 | 0.003 | 0.0037 | 0.0476 | 0.0984 | 0.1659 | 0.2726 |
| 0.7 | 0.002 | 0.002 | 0.0027 | 0.0282 | 0.0596 | 0.1002 | 0.161 |
| 0.8 | 0.0017 | 0.0016 | 0.0019 | 0.0242 | 0.0514 | 0.0876 | 0.1391 |
| 0.9 | 0.0013 | 0.0015 | 0.0018 | 0.0219 | 0.0403 | 0.0722 | 0.1194 |
| 0.95 | 0.001 | 0.0017 | 0.002 | 0.0177 | 0.0369 | 0.0639 | 0.1058 |
| 0.99 | 0.001 | 0.0017 | 0.0013 | 0.0146 | 0.0284 | 0.0479 | 0.0799 |

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 |