|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | D=10 | Mean | | Worst | | Best | | SD | |
| DE | PSO | DE | PSO | DE | PSO | DE | PSO |
| **1.High Conditioned Elliptic** | 13847912.51 | 8073056.182 | 11329469629 | 303160894.1 | 4.156417141 | 722777.7793 | 224211466.8 | 10742232.12 |
| **2.Bent cigar** | 575199046.5 | 370276499 | 55078378871 | 13784909632 | 550.2983055 | 49424781.22 | 2108562539 | 499618628 |
| **3.Discus** | 5604368.528 | 14259.18422 | 9392077562 | 8300859.823 | 0.057160347 | 3547.4347 | 185698785.6 | 95829.88252 |
| **4.Rosenbrock's** | 2988323.646 | 62.6408956 | 9213045092 | 254243.3884 | 0 | 0.017197673 | 115219801.6 | 2809.266597 |
| **5.Ackley's** | 20.52912947 | 20.18717707 | 21.97965076 | 21.24837133 | 20.37265326 | 16.36395908 | 0.107163445 | 1.169123865 |
| **6.Weierstrass** | -45.45340941 | -41.21055413 | 55.88622916 | -8.227244161 | -58.86960284 | -50.09142212 | 6.027684912 | 5.026829966 |
| **7.Griewank's** | -369.6727607 | -292.1863443 | 15.63395458 | -1.507598362 | -599.6731635 | -537.1009616 | 119.4567387 | 104.174184 |
| **8.Rastrigin's** | 925.9150662 | 664.9051488 | 53512.84515 | 18639.39087 | 30.34021902 | 266.1429784 | 2678.296108 | 644.9113454 |
| **9.Katsuura** | 382.0772382 | 588.5398273 | 66495.5493 | 5067.97605 | 54.62336599 | 125.4810788 | 1622.322417 | 351.1291776 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | D=30 | Mean | | Worst | | Best | | SD | |
| DE | PSO | DE | PSO | DE | PSO | DE | PSO |
| **1.High Conditioned Elliptic** | 333365470.6 | 107934811.4 | 15764505767 | 3175419339 | 31123442.18 | 48569896.34 | 391911886.8 | 59756807.67 |
| **2.Bent cigar** | 22005157929 | 5864398952 | 1.18362E+11 | 66316842277 | 1570138194 | 4009687587 | 17273409815 | 1760127417 |
| **3.Discus** | 2912364.632 | 22859.79513 | 9887906917 | 10863322.84 | 13386.19727 | 9347.850494 | 138055981.3 | 81762.88917 |
| **4.Rosenbrock's** | 1797102.68 | 15.62743023 | 9808574739 | 249353.8662 | 0 | 0.00498643 | 102432596.2 | 1398.487211 |
| **5.Ackley's** | 20.98802234 | 20.9775603 | 21.89099765 | 21.42829549 | 20.82241437 | 19.59225507 | 0.071809329 | 0.282341715 |
| **6.Weierstrass** | -295.031678 | -272.293298 | 213.0107106 | -107.576225 | -364.7328907 | -348.0933204 | 30.417817 | 29.06549005 |
| **7.Griewank's** | -62328.2425 | -28233.88763 | 30.6339579 | 17.78584936 | -669308.0584 | -166187.1002 | 126375.8748 | 37406.79481 |
| **8.Rastrigin's** | 24160.62821 | 6431.365072 | 130968.0118 | 72904.74137 | 2907.877568 | 4486.574046 | 17328.93911 | 1833.492071 |
| **9.Katsuura** | 126956.1921 | 182700.3523 | 2974826.3 | 688708.4173 | 52925.79456 | 122646.1096 | 65625.00168 | 41510.33544 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | D=50 | Max | | Min | | Mean | | SD | |
| PSO | DE | PSO | DE | PSO | DE | PSO | DE |
| **1.High Conditioned Elliptic** | 874904776.7 | 289129195.1 | 22316863282 | 5897535497 | 67245143.56 | 135802664 | 903812520.3 | 105118763 |
| **2.Bent cigar** | 53346902135 | 13814441110 | 1.78579E+11 | 1.26069E+11 | 6589226823 | 11105246557 | 37262988929 | 2568160144 |
| **3.Discus** | 1291104.961 | 40349.83734 | 9653560546 | 19177415.67 | 23950.48268 | 18883.25232 | 75800412.89 | 100837.1178 |
| **4.Rosenbrock's** | 645142.8189 | 21.35432936 | 8169824472 | 711478.5115 | 0 | 0.001021441 | 57605115.88 | 3036.696079 |
| **5.Ackley's** | 21.13911681 | 21.19046298 | 21.92580038 | 21.49594366 | 20.94355688 | 21.07939781 | 0.062809543 | 0.046200317 |
| **6.Weierstrass** | -699.0357689 | -628.9648845 | 369.7292093 | -224.8207234 | -883.655128 | -738.9410301 | 71.97909271 | 52.59891286 |
| **7.Griewank's** | -64042.13517 | -456496.1529 | 49.08247822 | 31.40763694 | -1860355.482 | -24012598.57 | 221895.8843 | 3135831.681 |
| **8.Rastrigin's** | 56523.59334 | 13563.37845 | 205683.7333 | 135127.3015 | 5400.864874 | 9366.916498 | 38825.69041 | 3127.635327 |
| **9.Katsuura** | 970511.2627 | 1223269.52 | 11271602.13 | 3437892.851 | 318186.4867 | 639057.7971 | 268534.6477 | 216043.645 |