|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | F1 |  |  | F2 |  |  | F3 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 3.5080e+03 | 3.7000e+03 |  | 3.0000e+02 | 6.3112e-09 |  | 4.5988e+02 | 2.9391e+01 |
| WFO | 1.0000e+02 | 5.5291e-14 |  | 3.0017e+02 | 6.7730e-01 |  | 4.1873e+02 | 2.7491e+01 |
| SMA | 2.5983e+09 | 1.0684e+09 |  | 4.2834e+04 | 1.0375e+04 |  | 6.1294e+02 | 4.1876e+01 |
| WOA | 2.5849e+06 | 1.9102e+06 |  | 1.4120e+05 | 6.7928e+04 |  | 5.5978e+02 | 4.6403e+01 |
| PSO | 2.3544e+03 | 2.5831e+03 |  | 3.0000e+02 | 2.4137e-03 |  | 4.5911e+02 | 2.8584e+01 |
| GWO | 1.7666e+09 | 1.2461e+09 |  | 3.8920e+04 | 1.3012e+04 |  | 5.7509e+02 | 9.2527e+01 |
| MFO | 1.0428e+10 | 7.4065e+09 |  | 1.0233e+05 | 8.3521e+04 |  | 1.2971e+03 | 7.2623e+02 |
| BMWOA | 2.2449e+08 | 1.3107e+08 |  | 7.1114e+04 | 8.6164e+03 |  | 6.1554e+02 | 4.5464e+01 |
| RCBA | 1.8075e+04 | 6.7617e+03 |  | 3.0100e+02 | 2.7592e-01 |  | 4.9066e+02 | 2.4049e+01 |
| SCADE | 1.9785e+10 | 2.5500e+09 |  | 5.9669e+04 | 7.3983e+03 |  | 3.4718e+03 | 7.6576e+02 |
| OBSCA | 1.7123e+10 | 2.3000e+09 |  | 6.1728e+04 | 5.8953e+03 |  | 2.6585e+03 | 7.3528e+02 |
|  | F4 |  |  | F5 |  |  | F6 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 5.4997e+02 | 1.0799e+01 |  | 6.0000e+02 | 8.8363e-05 |  | 7.8314e+02 | 1.1758e+01 |
| WFO | 5.7200e+02 | 1.2799e+01 |  | 6.0002e+02 | 1.7155e-02 |  | 8.0558e+02 | 1.8052e+01 |
| SMA | 7.1624e+02 | 3.0519e+01 |  | 6.4194e+02 | 6.7543e+00 |  | 1.0889e+03 | 7.7583e+01 |
| WOA | 7.8745e+02 | 6.7113e+01 |  | 6.7192e+02 | 1.2008e+01 |  | 1.2270e+03 | 9.1682e+01 |
| PSO | 7.0045e+02 | 3.9063e+01 |  | 6.4539e+02 | 9.5302e+00 |  | 1.0322e+03 | 6.1821e+01 |
| GWO | 5.9824e+02 | 2.4178e+01 |  | 6.0670e+02 | 3.0181e+00 |  | 8.4849e+02 | 3.1989e+01 |
| MFO | 7.1629e+02 | 5.5700e+01 |  | 6.4125e+02 | 1.3073e+01 |  | 1.1753e+03 | 2.2462e+02 |
| BMWOA | 7.9498e+02 | 5.0086e+01 |  | 6.6235e+02 | 1.0287e+01 |  | 1.2082e+03 | 9.0956e+01 |
| RCBA | 8.2776e+02 | 7.5238e+01 |  | 6.7162e+02 | 1.0373e+01 |  | 1.8482e+03 | 2.8943e+02 |
| SCADE | 8.2790e+02 | 2.1862e+01 |  | 6.5847e+02 | 5.2295e+00 |  | 1.1675e+03 | 3.3346e+01 |
| OBSCA | 8.1410e+02 | 2.4681e+01 |  | 6.5534e+02 | 5.6173e+00 |  | 1.1778e+03 | 4.3298e+01 |
|  | F7 |  |  | F8 |  |  | F9 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 8.4736e+02 | 1.0081e+01 |  | 9.0693e+02 | 7.7647e+00 |  | 3.1059e+03 | 2.9097e+02 |
| WFO | 8.6733e+02 | 1.6192e+01 |  | 1.1010e+03 | 2.3627e+02 |  | 3.1309e+03 | 4.2332e+02 |
| SMA | 9.6994e+02 | 2.3702e+01 |  | 5.7464e+03 | 9.4343e+02 |  | 5.6830e+03 | 7.5550e+02 |
| WOA | 1.0045e+03 | 3.5052e+01 |  | 7.4145e+03 | 1.9314e+03 |  | 5.9390e+03 | 7.5858e+02 |
| PSO | 9.5359e+02 | 2.5098e+01 |  | 4.3300e+03 | 9.1057e+02 |  | 4.9734e+03 | 6.7088e+02 |
| GWO | 8.8483e+02 | 1.8272e+01 |  | 1.9150e+03 | 6.6339e+02 |  | 4.0183e+03 | 8.0703e+02 |
| MFO | 1.0186e+03 | 4.3815e+01 |  | 7.3624e+03 | 1.8780e+03 |  | 5.7775e+03 | 8.2872e+02 |
| BMWOA | 1.0004e+03 | 3.6289e+01 |  | 7.9337e+03 | 1.1975e+03 |  | 7.5793e+03 | 6.4637e+02 |
| RCBA | 1.0650e+03 | 6.5873e+01 |  | 9.1006e+03 | 2.7948e+03 |  | 5.6895e+03 | 6.7634e+02 |
| SCADE | 1.0810e+03 | 1.9483e+01 |  | 8.2994e+03 | 9.6310e+02 |  | 8.2152e+03 | 2.0426e+02 |
| OBSCA | 1.0706e+03 | 1.7746e+01 |  | 6.6408e+03 | 8.9623e+02 |  | 7.4520e+03 | 4.4436e+02 |
|  | F10 |  |  | F11 |  |  | F12 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 1.1234e+03 | 1.4431e+01 |  | 1.5387e+04 | 1.0361e+04 |  | 4.7689e+03 | 1.1012e+04 |
| WFO | 1.1414e+03 | 2.1497e+01 |  | 4.7735e+03 | 4.0772e+03 |  | 1.3567e+03 | 2.2785e+01 |
| SMA | 1.5788e+03 | 1.4644e+02 |  | 1.0161e+08 | 7.0537e+07 |  | 1.7830e+06 | 1.3620e+06 |
| WOA | 1.5342e+03 | 2.4562e+02 |  | 3.9162e+07 | 2.5884e+07 |  | 1.7768e+05 | 9.6094e+04 |
| PSO | 1.2130e+03 | 3.9336e+01 |  | 3.1894e+04 | 1.6955e+04 |  | 7.3856e+03 | 6.3378e+03 |
| GWO | 1.7304e+03 | 5.7358e+02 |  | 1.0349e+08 | 3.2923e+08 |  | 9.5168e+06 | 2.9574e+07 |
| MFO | 5.5881e+03 | 5.8271e+03 |  | 2.9027e+08 | 4.5870e+08 |  | 7.8536e+07 | 2.6749e+08 |
| BMWOA | 1.6172e+03 | 1.4533e+02 |  | 6.5890e+07 | 5.3880e+07 |  | 2.9397e+05 | 1.8189e+05 |
| RCBA | 1.2989e+03 | 6.2846e+01 |  | 2.0947e+06 | 1.7458e+06 |  | 1.1200e+05 | 6.2463e+04 |
| SCADE | 3.4570e+03 | 5.8974e+02 |  | 2.1158e+09 | 4.4590e+08 |  | 6.7712e+08 | 2.3327e+08 |
| OBSCA | 2.8453e+03 | 5.8603e+02 |  | 1.8939e+09 | 5.0490e+08 |  | 6.1966e+08 | 3.0078e+08 |
|  | F13 |  |  | F14 |  |  | F15 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 1.4356e+03 | 1.4514e+01 |  | 1.5227e+03 | 1.8538e+01 |  | 2.0734e+03 | 1.7901e+02 |
| WFO | 1.4380e+03 | 1.1253e+01 |  | 1.5202e+03 | 9.0413e+00 |  | 2.2173e+03 | 2.5411e+02 |
| SMA | 1.4070e+05 | 9.8999e+04 |  | 1.7595e+04 | 6.5794e+03 |  | 2.8030e+03 | 2.4864e+02 |
| WOA | 9.5283e+05 | 1.1654e+06 |  | 7.7574e+04 | 4.5412e+04 |  | 3.6683e+03 | 5.2190e+02 |
| PSO | 7.3178e+03 | 4.9869e+03 |  | 9.0833e+03 | 9.2128e+03 |  | 2.9367e+03 | 3.4114e+02 |
| GWO | 2.5240e+05 | 4.7345e+05 |  | 1.3945e+06 | 6.1608e+06 |  | 2.3257e+03 | 2.4894e+02 |
| MFO | 8.4134e+05 | 2.6449e+06 |  | 5.6487e+04 | 5.6856e+04 |  | 3.1653e+03 | 3.2822e+02 |
| BMWOA | 7.1162e+05 | 5.2048e+05 |  | 8.8749e+04 | 7.1235e+04 |  | 3.3981e+03 | 4.7286e+02 |
| RCBA | 8.2832e+03 | 5.0363e+03 |  | 4.0947e+04 | 2.2555e+04 |  | 3.2437e+03 | 3.5160e+02 |
| SCADE | 3.3196e+05 | 1.5454e+05 |  | 1.1558e+07 | 8.4082e+06 |  | 3.8479e+03 | 2.7594e+02 |
| OBSCA | 2.4489e+05 | 1.0167e+05 |  | 1.3619e+07 | 1.7533e+07 |  | 3.8152e+03 | 2.2391e+02 |
|  | F16 |  |  | F17 |  |  | F18 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 1.7928e+03 | 6.2596e+01 |  | 1.8419e+03 | 1.1983e+01 |  | 1.9165e+03 | 7.5082e+00 |
| WFO | 1.8750e+03 | 1.2044e+02 |  | 1.9098e+03 | 3.6670e+02 |  | 1.9184e+03 | 6.2785e+00 |
| SMA | 2.2687e+03 | 2.1356e+02 |  | 6.5171e+05 | 6.2652e+05 |  | 5.9869e+05 | 6.1635e+05 |
| WOA | 2.3607e+03 | 2.7412e+02 |  | 1.7783e+06 | 2.0429e+06 |  | 2.6496e+06 | 2.1781e+06 |
| PSO | 2.5390e+03 | 2.2363e+02 |  | 1.3278e+05 | 9.6228e+04 |  | 1.1269e+04 | 1.1997e+04 |
| GWO | 1.9430e+03 | 1.0644e+02 |  | 8.8193e+05 | 1.0067e+06 |  | 1.0326e+06 | 2.5068e+06 |
| MFO | 2.5699e+03 | 2.7939e+02 |  | 2.3358e+06 | 4.7821e+06 |  | 6.7997e+06 | 3.2679e+07 |
| BMWOA | 2.4717e+03 | 1.8028e+02 |  | 3.1564e+06 | 2.8627e+06 |  | 7.6912e+05 | 7.0991e+05 |
| RCBA | 2.7560e+03 | 3.6576e+02 |  | 2.4188e+05 | 2.1124e+05 |  | 1.8488e+04 | 1.3323e+04 |
| SCADE | 2.5137e+03 | 1.2708e+02 |  | 3.8268e+06 | 2.3629e+06 |  | 2.9098e+07 | 1.7349e+07 |
| OBSCA | 2.5487e+03 | 1.6827e+02 |  | 4.2102e+06 | 2.0960e+06 |  | 3.9773e+07 | 2.2896e+07 |
|  | F19 |  |  | F20 |  |  | F21 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 2.1384e+03 | 7.3285e+01 |  | 2.3517e+03 | 1.2913e+01 |  | 2.4502e+03 | 5.7241e+02 |
| WFO | 2.1566e+03 | 9.6321e+01 |  | 2.3703e+03 | 3.6719e+01 |  | 2.7643e+03 | 9.6122e+02 |
| SMA | 2.4726e+03 | 1.2406e+02 |  | 2.4743e+03 | 3.0686e+01 |  | 3.9967e+03 | 2.1179e+03 |
| WOA | 2.7343e+03 | 1.9266e+02 |  | 2.5718e+03 | 7.0859e+01 |  | 6.7445e+03 | 1.9111e+03 |
| PSO | 2.6416e+03 | 1.9875e+02 |  | 2.4700e+03 | 3.1172e+01 |  | 5.7126e+03 | 2.1883e+03 |
| GWO | 2.4041e+03 | 1.6552e+02 |  | 2.3818e+03 | 2.2317e+01 |  | 4.2297e+03 | 1.5531e+03 |
| MFO | 2.7081e+03 | 2.6741e+02 |  | 2.5004e+03 | 4.8231e+01 |  | 6.2803e+03 | 1.4249e+03 |
| BMWOA | 2.6822e+03 | 2.1141e+02 |  | 2.5335e+03 | 4.5661e+01 |  | 6.3480e+03 | 3.2099e+03 |
| RCBA | 3.0075e+03 | 3.1251e+02 |  | 2.6377e+03 | 7.6391e+01 |  | 7.2589e+03 | 5.2947e+02 |
| SCADE | 2.7153e+03 | 9.7297e+01 |  | 2.5832e+03 | 2.1761e+01 |  | 4.5473e+03 | 3.0478e+02 |
| OBSCA | 2.6429e+03 | 1.1320e+02 |  | 2.4535e+03 | 9.4295e+01 |  | 4.1037e+03 | 3.0836e+02 |
|  | F22 |  |  | F23 |  |  | F24 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 2.6984e+03 | 1.1474e+01 |  | 2.8796e+03 | 1.4008e+01 |  | 2.8869e+03 | 1.4095e+00 |
| WFO | 2.7303e+03 | 2.1552e+01 |  | 2.9460e+03 | 3.7317e+01 |  | 2.8877e+03 | 3.2476e+00 |
| SMA | 2.8739e+03 | 2.9468e+01 |  | 3.0120e+03 | 3.4209e+01 |  | 3.0188e+03 | 4.5096e+01 |
| WOA | 3.0297e+03 | 1.0632e+02 |  | 3.1957e+03 | 8.9707e+01 |  | 2.9436e+03 | 2.9007e+01 |
| PSO | 3.2673e+03 | 1.3505e+02 |  | 3.3337e+03 | 9.7681e+01 |  | 2.8804e+03 | 6.2875e+00 |
| GWO | 2.7424e+03 | 3.0441e+01 |  | 2.9175e+03 | 4.3751e+01 |  | 3.0000e+03 | 4.6027e+01 |
| MFO | 2.8423e+03 | 4.2789e+01 |  | 2.9844e+03 | 3.0088e+01 |  | 3.3420e+03 | 4.9190e+02 |
| BMWOA | 2.9592e+03 | 7.3889e+01 |  | 3.1266e+03 | 9.7854e+01 |  | 3.0156e+03 | 3.2878e+01 |
| RCBA | 3.3371e+03 | 1.4406e+02 |  | 3.3922e+03 | 1.4228e+02 |  | 2.8926e+03 | 1.8229e+01 |
| SCADE | 3.0136e+03 | 2.8481e+01 |  | 3.1758e+03 | 2.7241e+01 |  | 3.4525e+03 | 1.0613e+02 |
| OBSCA | 3.0232e+03 | 3.4027e+01 |  | 3.1839e+03 | 3.5995e+01 |  | 3.3774e+03 | 1.0471e+02 |
|  | F25 |  |  | F26 |  |  | F27 |  |
|  | Avg | Std |  | Avg | Std |  | Avg | Std |
| CC\_WFO | 4.1392e+03 | 3.6619e+02 |  | 3.2063e+03 | 9.0145e+00 |  | 3.1532e+03 | 6.2431e+01 |
| WFO | 3.7798e+03 | 8.8835e+02 |  | 3.2160e+03 | 1.6267e+01 |  | 3.1363e+03 | 5.7874e+01 |
| SMA | 5.1255e+03 | 6.7882e+02 |  | 3.2566e+03 | 2.7660e+01 |  | 3.4328e+03 | 4.8386e+01 |
| WOA | 7.5981e+03 | 1.1118e+03 |  | 3.3527e+03 | 7.8931e+01 |  | 3.3067e+03 | 3.4441e+01 |
| PSO | 6.4046e+03 | 2.4402e+03 |  | 3.3329e+03 | 4.0727e+02 |  | 3.1533e+03 | 6.4712e+01 |
| GWO | 4.5800e+03 | 4.0151e+02 |  | 3.2526e+03 | 2.1645e+01 |  | 3.4352e+03 | 8.4277e+01 |
| MFO | 5.9622e+03 | 6.6153e+02 |  | 3.2525e+03 | 1.9193e+01 |  | 4.5068e+03 | 1.0359e+03 |
| BMWOA | 6.5585e+03 | 1.3308e+03 |  | 3.3414e+03 | 5.7246e+01 |  | 3.4029e+03 | 4.9872e+01 |
| RCBA | 9.3615e+03 | 2.6946e+03 |  | 3.4369e+03 | 1.6322e+02 |  | 3.1481e+03 | 6.9297e+01 |
| SCADE | 7.4997e+03 | 3.7987e+02 |  | 3.4577e+03 | 5.5728e+01 |  | 4.2991e+03 | 2.1804e+02 |
| OBSCA | 6.9042e+03 | 7.6990e+02 |  | 3.4542e+03 | 5.7582e+01 |  | 4.1613e+03 | 2.0316e+02 |
|  | F28 |  |  | F29 |  |  |  |  |
|  | Avg | Std |  | Avg | Std |  |  |  |
| CC\_WFO | 3.4344e+03 | 9.0816e+01 |  | 5.1389e+03 | 2.0133e+02 |  |  |  |
| WFO | 3.4850e+03 | 1.4586e+02 |  | 5.1761e+03 | 2.1975e+02 |  |  |  |
| SMA | 4.0202e+03 | 2.3602e+02 |  | 5.2587e+06 | 3.3127e+06 |  |  |  |
| WOA | 4.8642e+03 | 3.7350e+02 |  | 1.2483e+07 | 8.9147e+06 |  |  |  |
| PSO | 4.0133e+03 | 3.2025e+02 |  | 5.4839e+03 | 2.6071e+03 |  |  |  |
| GWO | 3.7443e+03 | 1.5855e+02 |  | 5.5806e+06 | 7.5234e+06 |  |  |  |
| MFO | 4.1168e+03 | 2.6364e+02 |  | 1.3054e+06 | 2.0667e+06 |  |  |  |
| BMWOA | 4.8390e+03 | 3.8061e+02 |  | 5.6070e+06 | 3.3086e+06 |  |  |  |
| RCBA | 4.9987e+03 | 5.2023e+02 |  | 2.0987e+05 | 1.4512e+05 |  |  |  |
| SCADE | 5.0592e+03 | 1.9107e+02 |  | 1.0479e+08 | 3.8021e+07 |  |  |  |
| OBSCA | 4.8670e+03 | 2.6220e+02 |  | 1.2160e+08 | 3.7095e+07 |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Overall Rank** |  |  |  |  |  |  |
|  | **RANK** | **+/=-** | **AVG** |  |  |  |  |
| CC\_WFO | 1 | ~ | 1.3793 |  |  |  |  |
| WFO | 2 | 14/11/4 | 1.8621 |  |  |  |  |
| SMA | 5 | 29/0/0 | 5.3793 |  |  |  |  |
| WOA | 9 | 29/0/0 | 7.7931 |  |  |  |  |
| PSO | 3 | 24/4/1 | 4.3793 |  |  |  |  |
| GWO | 4 | 29/0/0 | 4.8966 |  |  |  |  |
| MFO | 7 | 29/0/0 | 7.4138 |  |  |  |  |
| BMWOA | 8 | 29/0/0 | 7.4828 |  |  |  |  |
| RCBA | 6 | 27/2/0 | 7.2759 |  |  |  |  |
| SCADE | 11 | 29/0/0 | 9.4828 |  |  |  |  |
| OBSCA | 10 | 29/0/0 | 8.6552 |  |  |  |  |