Heuristic Algorithms
Achieved Results for Hybrid Modified PSO with Differential Evolution

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FES	5×10^3	5×10^4	5×10^5
Best	1.1460	0.3802	0.3145
Median	5.4936	5.8363	5.8363
Worst	22.2807	22.2807	21.9458
v	1002.7803	2193.0701	3028.1172
Mean	6.5788	7.2567	7.0713
std	6.6467	6.6905	6.1535

Table 1: Error Values Problem pg01 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.4574	0.1302	0.0130
Median	0.6070	0.6097	0.6098
Worst	0.9599	0.9599	0.9599
v	0.0000	0.0000	0.0000
Mean	0.6009	0.5955	0.5940
std	0.0319	0.0668	0.0832

Table 2: Error Values Problem pg02 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.9364	0.9992	0.9992
Median	0.9814	0.9618	0.9579
Worst	1.0008	1.0008	1.0005
v	1.6617	3.8092	5.6309
Mean	0.9170	0.8999	0.9029
std	0.1661	0.1581	0.1546

Table 3: Error Values Problem pg03 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	231.6950	231.6950	231.6950
Median	1438.9815	1536.7551	1536.7551
Worst	58010.9589	58010.9589	57531.8694
v	0.0000	0.0000	0.0000
Mean	1451.6227	1563.6350	1577.8288
std	582.9772	622.2475	616.5494

Table 4: Error Values Problem pg04 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	1086.5760	1086.5760	566.6998
Median	842.5968	1007.6712	1091.5496
Worst	11179.2284	12583.0069	12583.0069
v	10478.9394	20741.0805	31738.2287
Mean	1130.3205	1306.6988	1328.8757
std	1005.3016	955.0673	968.2051

Table 5: Error Values Problem pg05 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	60.0960	0.0002	0.0000
Median	6808.8852	7007.2909	7128.4670
Worst	8101.6356	156393.4035	158107.1027
v	8499.4438	28290.5360	46642.7125
Mean	7287.7543	12476.8252	14103.8926
std	4508.4743	23062.4928	26862.1240

Table 6: Error Values Problem pg06 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	14.1485	4.3981	0.1240
Median	1078.3522	1089.1051	1237.7110
Worst	2957.7344	3290.4520	3397.6613
v	2053.4333	3902.2641	5400.6855
Mean	1399.3583	1411.3368	1477.5492
std	808.6150	880.0721	872.4380

Table 7: Error Values Problem pg07 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.0000	0.0000	0.0000
Median	0.0914	0.0854	0.0854
Worst	0.2979	0.9240	0.9240
v	16.0552	18.6342	24.5704
Mean	0.0872	0.0925	0.0853
std	0.0846	0.1496	0.1236

Table 8: Error Values Problem pg08 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	6.1611	0.2685	0.0284
Median	11640.9005	7314.9009	7203.5485
Worst	2179612.8913	3055487.4382	8253897.5162
v	131.0522	319.3474	369.0178
Mean	171326.4944	190871.6989	336736.6387
std	431421.0867	526702.7350	1124339.6107

Table 9: Error Values Problem pg09 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	4238.5199	1101.1882	40.9777
Median	9693.2615	9198.7678	9126.0163
Worst	31523.6477	31523.6477	31523.6477
v	36.4767	81.2709	119.9554
Mean	9962.6595	9623.4001	9312.5667
std	3839.8146	3988.8880	4069.2014

Table 10: Error Values Problem pg10 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.0197	0.0143	0.0143
Median	0.0835	0.1236	0.1266
Worst	1.7538	1.7573	1.7968
v	0.3516	0.6716	1.1892
Mean	0.1047	0.1221	0.1289
std	0.0833	0.0876	0.0888

Table 11: Error Values Problem pg11 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.0000	0.0000	0.0000
Median	0.0699	0.0833	0.0889
Worst	1.7936	1.7418	1.7269
v	0.0000	0.0323	0.0400
Mean	0.0767	0.0924	0.0997
std	0.0641	0.0696	0.0739

Table 12: Error Values Problem pg12 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.9823	0.5522	0.9165
Median	0.9061	0.9323	0.9361
Worst	2.5559	3.8792	3.8792
v	22.5154	42.9649	67.9085
Mean	0.9116	0.9678	0.9807
std	0.4595	0.5775	0.5841

Table 13: Error Values Problem pg13 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	48.1864	2.2893	2.2893
Median	369.7164	357.3931	354.5134
Worst	143.7161	93.2404	93.2404
v	319.3361	624.1089	927.0268
Mean	353.1493	343.4018	342.4006
std	84.6668	88.8886	89.4230

Table 14:   Error Values Problem pg14 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	5.4651	5.4651	5.4651
Median	5.6502	5.7233	5.7233
Worst	1935.4764	1941.7201	1941.7201
v	138.4254	262.9621	412.2875
Mean	6.8160	7.2090	7.1547
std	6.0423	5.7803	6.0385

Table 15:   Error Values Problem pg15 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.0630	0.0003	0.0000
Median	0.5998	0.6086	0.6286
Worst	2.6472	2.6472	2.3368
v	292.8985	532.9265	847.2943
Mean	0.6155	0.6180	0.6216
std	0.3050	0.2925	0.3197

Table 16:   Error Values Problem pg16 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	231.2575	111.6809	111.6809
Median	1669.4648	2889.1996	2889.1996
Worst	31386.5187	31386.5187	33384.5751
v	2638.2965	5388.0262	8109.5629
Mean	3229.7218	3451.9305	3400.1025
std	3395.5345	3058.4913	3053.9900

Table 17:   Error Values Problem pg17 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.4577	0.1982	0.1982
Median	3.9110	4.0270	4.1513
Worst	11.1690	11.1690	12.7144
v	4016.6355	8034.7856	12738.1943
Mean	4.0414	4.4797	4.7895
std	2.8658	3.3140	3.7214

Table 18:   Error Values Problem pg18 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	151.8572	12.9922	10.1087
Median	2729.6370	2835.1976	2870.2247
Worst	5794.4168	5794.4168	5794.4168
v	0.0000	0.0000	0.0000
Mean	2778.5679	2876.6385	2912.4503
std	1173.4211	1152.7623	1099.2346

Table 19: Error Values Problem pg19 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	5.1854	0.6224	0.0685
Median	12.1465	12.5425	12.2626
Worst	16.8307	16.8307	17.7392
v	293.3592	576.0859	859.5790
Mean	12.2199	12.1048	12.0754
std	2.6530	2.7703	2.8851

Table 20: Error Values Problem pg20 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	523.0888	274.9019	274.9019
Median	336.9119	330.4791	375.5592
Worst	1120.7400	1192.0409	1192.0409
v	853.8485	1609.7135	2389.6546
Mean	362.4309	350.8596	382.7729
std	175.0167	205.0589	205.9605

Table 21: Error Values Problem pg21 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	11010.9946	3387.6922	1813.4092
Median	10447.2047	8854.6660	9804.2567
Worst	19028.7433	20193.4634	20193.4634
v	2280612045.0042	4729544257.6495	7235327544.3919
Mean	9503.8517	8875.4428	9413.4609
std	4122.9267	5040.4080	5490.2804

Table 22: Error Values Problem pg22 using Hybrid Modified PSO with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	606.7431	159.2376	159.2376
Median	386.3949	346.2077	344.4781
Worst	222.2396	589.4850	589.4850
v	399.7330	816.8717	1236.0184
Mean	442.5838	453.5708	446.8307
std	284.6563	313.5473	328.5029

Table 23: Error Values Problem pg23 using Hybrid Modified PSO
with Differential Evolution

FES	5×10^3	5×10^4	5×10^5
Best	0.0996	0.0000	0.0000
Median	0.7974	0.8728	0.8728
Worst	9.1479	8.6092	8.6092
v	0.0000	0.0000	0.0000
Mean	0.8703	0.9135	0.9120
std	0.4475	0.5247	0.4910

Table 24: Error Values Problem pg24 using Hybrid Modified PSO
with Differential Evolution

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg01	0.1376	5.4936	22.2807	6.5788	6.6467	0.0333	0.0000	-1.0000
50000	pg01	0.1342	5.8363	22.2807	7.2567	6.6905	0.0333	0.0000	-1.0000
500000	pg01	0.1342	5.8363	21.9458	7.0713	6.1535	0.0333	0.0000	-1.0000

Table 25:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg02	0.4574	0.6070	0.9599	0.6009	0.0319	1.0000	0.0000	-1.0000
50000	pg02	0.1302	0.6097	0.9599	0.5955	0.0668	1.0000	0.0000	-1.0000
500000	pg02	0.0130	0.6098	0.9599	0.5940	0.0832	1.0000	0.0000	-1.0000

Table 26:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg03	0.1137	0.9814	1.0008	0.9170	0.1661	0.0000	0.0000	-1.0000
50000	pg03	0.1137	0.9618	1.0008	0.8999	0.1581	0.0000	0.0000	-1.0000
500000	pg03	0.1137	0.9579	1.0005	0.9029	0.1546	0.0000	0.0000	-1.0000

Table 27:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg04	231.6950	1438.9815	58010.9589	1451.6227	582.9772	1.0000	0.0000	-1.0000
50000	pg04	231.6950	1536.7551	58010.9589	1563.6350	622.2475	1.0000	0.0000	-1.0000
500000	pg04	231.6950	1536.7551	57531.8694	1577.8288	616.5494	1.0000	0.0000	-1.0000

Table 28:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg05	77.0443	842.5968	11179.2284	1130.3205	1005.3016	0.0000	0.0000	-1.0000
50000	pg05	42.5942	1007.6712	12583.0069	1306.6988	955.0673	0.0000	0.0000	-1.0000
500000	pg05	5.4168	1091.5496	12583.0069	1328.8757	968.2051	0.0000	0.0000	-1.0000

Table 29:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg06	60.0960	6808.8852	8101.6356	7287.7543	4508.4743	0.0333	0.0000	-1.0000
50000	pg06	0.0002	7007.2909	156393.4035	12476.8252	23062.4928	0.0333	0.0000	-1.0000
500000	pg06	0.0000	7128.4670	158107.1027	14103.8926	26862.1240	0.0333	0.0333	16834844.0000

Table 30:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg07	14.1485	1078.3522	2957.7344	1399.3583	808.6150	0.0333	0.0000	-1.0000
50000	pg07	4.3981	1089.1051	3290.4520	1411.3368	880.0721	0.0333	0.0000	-1.0000
500000	pg07	0.1240	1237.7110	3397.6613	1477.5492	872.4380	0.0333	0.0000	-1.0000

Table 31:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg08	0.0000	0.0914	0.2979	0.0872	0.0846	0.7000	0.0333	477368.0000
50000	pg08	0.0000	0.0854	0.9240	0.0925	0.1496	0.8333	0.0333	2240440.0000
500000	pg08	0.0000	0.0854	0.9240	0.0853	0.1236	0.7000	0.0333	16808148.0000

Table 32:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg09	6.1611	11640.9005	2179612.8913	171326.4944	431421.0867	0.8333	0.0000	-1.0000
50000	pg09	0.2685	7314.9009	3055487.4382	190871.6989	526702.7350	0.8333	0.0000	-1.0000
500000	pg09	0.0284	7203.5485	8253897.5162	336736.6387	1124339.6107	0.9667	0.0000	-1.0000

Table 33:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg10	3236.0256	9693.2615	31523.6477	9962.6595	3839.8146	0.0333	0.0000	-1.0000
50000	pg10	1101.1882	9198.7678	31523.6477	9623.4001	3988.8880	0.0333	0.0000	-1.0000
500000	pg10	40.9777	9126.0163	31523.6477	9312.5667	4069.2014	0.0333	0.0000	-1.0000

Table 34:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg11	0.0017	0.0835	1.7538	0.1047	0.0833	0.0000	0.0000	-1.0000
50000	pg11	0.0017	0.1236	1.7573	0.1221	0.0876	0.0000	0.0000	-1.0000
500000	pg11	0.0010	0.1266	1.7968	0.1289	0.0888	0.0000	0.0000	-1.0000

Table 35:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg12	0.0000	0.0699	1.7936	0.0767	0.0641	1.0000	0.0333	478636.0000
50000	pg12	0.0000	0.0833	1.7418	0.0924	0.0696	0.9333	0.0000	-1.0000
500000	pg12	0.0000	0.0889	1.7269	0.0997	0.0739	0.9333	0.0000	-1.0000

Table 36:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg13	0.1896	0.9061	2.5559	0.9116	0.4595	0.0000	0.0000	-1.0000
50000	pg13	0.0883	0.9323	3.8792	0.9678	0.5775	0.0000	0.0000	-1.0000
500000	pg13	0.0071	0.9361	3.8792	0.9807	0.5841	0.0000	0.0000	-1.0000

Table 37:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg14	48.1864	369.7164	143.7161	353.1493	84.6668	0.0000	0.0000	-1.0000
50000	pg14	2.2893	357.3931	93.2404	343.4018	88.8886	0.0000	0.0000	-1.0000
500000	pg14	2.2893	354.5134	93.2404	342.4006	89.4230	0.0000	0.0000	-1.0000

Table 38:　Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level ($f(\mathbf{x}) - f(\mathbf{x}^*) \leq$ 0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg15	0.0368	5.6502	1935.4764	6.8160	6.0423	0.0000	0.0000	-1.0000
50000	pg15	0.0368	5.7233	1941.7201	7.2090	5.7803	0.0000	0.0000	-1.0000
500000	pg15	0.0368	5.7233	1941.7201	7.1547	6.0385	0.0000	0.0000	-1.0000

Table 39:　Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level ($f(\mathbf{x}) - f(\mathbf{x}^*) \leq$ 0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg16	0.0630	0.5998	2.6472	0.6155	0.3050	0.0333	0.0000	-1.0000
50000	pg16	0.0003	0.6086	2.6472	0.6180	0.2925	0.0333	0.0000	-1.0000
500000	pg16	0.0000	0.6286	2.3368	0.6216	0.3197	0.0667	0.0333	17176235.0000

Table 40:　Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level ($f(\mathbf{x}) - f(\mathbf{x}^*) \leq$ 0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg17	41.9662	1669.4648	31386.5187	3229.7218	3395.5345	0.0000	0.0000	-1.0000
50000	pg17	41.9662	2889.1996	31386.5187	3451.9305	3058.4913	0.0000	0.0000	-1.0000
500000	pg17	41.9662	2889.1996	33384.5751	3400.1025	3053.9900	0.0000	0.0000	-1.0000

Table 41:　Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level ($f(\mathbf{x}) - f(\mathbf{x}^*) \leq$ 0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg18	0.0169	3.9110	11.1690	4.0414	2.8658	0.0333	0.0000	-1.0000
50000	pg18	0.0169	4.0270	11.1690	4.4797	3.3140	0.0333	0.0000	-1.0000
500000	pg18	0.0169	4.1513	12.7144	4.7895	3.7214	0.0333	0.0000	-1.0000

Table 42:　Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level ($f(\mathbf{x}) - f(\mathbf{x}^*) \leq$ 0.0001), Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg19	151.8572	2729.6370	5794.4168	2778.5679	1173.4211	1.0000	0.0000	-1.0000
50000	pg19	12.9922	2835.1976	5794.4168	2876.6385	1152.7623	1.0000	0.0000	-1.0000
500000	pg19	10.1087	2870.2247	5794.4168	2912.4503	1099.2346	1.0000	0.0000	-1.0000

Table 43:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg20	5.1854	12.1465	16.8307	12.2199	2.6530	0.0000	0.0000	-1.0000
50000	pg20	0.6224	12.5425	16.8307	12.1048	2.7703	0.0000	0.0000	-1.0000
500000	pg20	0.0685	12.2626	17.7392	12.0754	2.8851	0.0000	0.0000	-1.0000

Table 44:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg21	59.8613	336.9119	1120.7400	362.4309	175.0167	0.0000	0.0000	-1.0000
50000	pg21	30.8209	330.4791	1192.0409	350.8596	205.0589	0.0000	0.0000	-1.0000
500000	pg21	25.1042	375.5592	1192.0409	382.7729	205.9605	0.0000	0.0000	-1.0000

Table 45:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg22	1706.0294	10447.2047	19028.7433	9503.8517	4122.9267	0.0000	0.0000	-1.0000
50000	pg22	346.4207	8854.6660	20193.4634	8875.4428	5040.4080	0.0000	0.0000	-1.0000
500000	pg22	44.7417	9804.2567	20193.4634	9413.4609	5490.2804	0.0000	0.0000	-1.0000

Table 46:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg23	7.3683	386.3949	222.2396	442.5838	284.6563	0.0000	0.0000	-1.0000
50000	pg23	7.3683	346.2077	589.4850	453.5708	313.5473	0.0000	0.0000	-1.0000
500000	pg23	7.3683	344.4781	589.4850	446.8307	328.5029	0.0000	0.0000	-1.0000

Table 47:   Hybrid Modified PSO with Differential Evolution.
Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq$
$0.0001)$, Success Rate, Feasible Rate and Success Performance

Max FES	Prob.	Best	Median	Worst	Mean	Std	FR	SR	SP
5000	pg24	0.0996	0.7974	9.1479	0.8703	0.4475	1.0000	0.0000	-1.0000
50000	pg24	0.0000	0.8728	8.6092	0.9135	0.5247	1.0000	0.0333	2242744.0000
500000	pg24	0.0000	0.8728	8.6092	0.9120	0.4910	1.0000	0.0333	16816360.0000

Table 48:   Hybrid Modified PSO with Differential Evolution. Number of FES to achieve the fixed accuracy level $(f(\mathbf{x}) - f(\mathbf{x}^*) \leq 0.0001)$, Success Rate, Feasible Rate and Success Performance