Optimization using Particle Swarm, Firefly, and Harmony Search Algorithms

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Table 0.1: Dragonfly Algorithm Best Solution Analytic Over 30 Experimentations

f(x)	Average	Standard Deviation	Median	Range	Time (ms)	Function Call
Schwefel	-117210.5104	229928.4593	-46395.77318	3335693.265	4210.066667	10000
DeJong 1	17224.88395	23781.01372	3685.608538	69344.99448	4.21E+03	10000
Rosenbrocks Saddle	5164611101	9281541580	22216914.64	33809277825	4268.6	10000
Rastrigin	451901.4719	631267.2083	57672.88822	1909735.49	7081.457627	10000
Griewangk	104.6888714	145.8502238	14.0767555	426.500918	4262.766667	10000
Sine Envelope Sine Wave	-22.11285496	2.736525247	-21.920334	10.388126	4369.7	10000
Stretch V Sine Wave	-154.4883816	109.7962651	-129.062768	553.474658	4377.1	10000
Ackley One	140.0012477	149.7402539	58.458612	458.433819	4.30E+03	10000
Ackley Two	225.782694	177.9501781	190.543691	525.566853	4339.9	10000
Egg Holder	-220615.0498	492288.211	-79718.7173	4672632.688	4251.6	10000
Rana	-177374.0414	311840.0009	-60907.84317	1928129.369	4297.8	10000
Pathological	-4.775482427	3.499182693	-5.652142	17.11091	4351.666667	10000
Michalewicz	-5.094057729	0.780102441	-5.04517	4.146122	4270.6	10000
Masters Cosine Wave	-11.12432776	10.9795787	-4.724859	27.680931	4372.133333	10000
Quartic	777044380.3	1361148515	8213336.517	4989970681	4223.033333	10000
Levy	214.9503487	261.9944889	55.0614835	751.587675	4228.166667	10000
Step	109.3108829	174.6024219	25.81832	656.797013	4239.066667	10000
Alpine	2598.956233	5224.715532	127.086666	23371.08988	4353	10000

Table 0.2: Dragonfly Algorithm Worst Solution Analytic over 30 Experimentations

f(x)	Average	Standard Deviation	Median	Range	Time (ms)	Function Call
Schwefel	124149.4718	160351.4575	62851.17984	1166541.047	4210.066667	10000
DeJong 1	1.04E+11	8.41E+11	329805054.2	1.44E+13	4.21E+03	10000
Rosenbrocks Saddle	3.08E+23	2.23E+24	9.70E+18	4.49E+25	4268.6	10000
Rastrigin	1.35E+12	5.76E+12	11427069278	7.91E+13	7081.457627	10000
Griewangk	1192691005	12858081342	3441358.275	2.33E+11	4262.766667	10000
Sine Envelope Sine Wave	-7.741083406	1.081377941	-7.912	4.9543	4369.7	10000
Stretch V Sine Wave	214.5287284	120.1828417	172.666305	495.685136	4377.1	10000
Ackley One	52023.09781	254506.3201	11178.20719	4142262.036	4.30E+03	10000
Ackley Two	613.591723	47.47513804	615.25907	28.303451	4339.9	10000
Egg Holder	184412.1325	3.25E+05	77065.28073	4.90E+06	4251.6	10000
Rana	178301.427	323752.3816	58852.68211	2144793.041	4297.8	10000
Pathological	15.65014188	1.277669702	15.628011	3.409773	4351.666667	10000
Michalewicz	5.029507154	0.728390521	4.952429	3.833737	4270.6	10000
Masters Cosine Wave	5.900066699	4.656794734	4.616048	15.580359	4372.133333	10000
Quartic	3.24E+22	3.96E+23	9.95E+17	1.29E+25	4223.033333	10000
Levy	179986301.1	906627160.6	3507284.253	13486987171	4228.166667	10000
Step	177922.9258	516934.5116	34578.20732	5730651.918	4239.066667	10000
Alpine	20376133416	1.02E+11	197308074.1	1.75E+12	4353	10000