SUPPLEMENTARY FILE

Table S1: Selected benchmark problems

Unimodal benchmark problems			
Benchmark Functions	Range	D	$minf$
$BS1(\varkappa) = \sum_{i=1}^{n}(\varkappa_i + 40)^2 - 80$	$[-100, 100]$	30	-80
$BS2(\varkappa) = \sum_{i=1}^{n}(\sum_{j=1}^{i}\varkappa_j + 60)^2 - 80$	$[-100, 100]$	30	-80
$BS3(\varkappa) = max_i\{\ mod\ (\varkappa_i + 60), 1 \leq i \leq n\} - 80$	$[-100, 100]$	30	-80
$BS4(\varkappa) = \sum_{i=1}^{n-1}[100((\varkappa_{i+1} + 60) - (\varkappa_i + 60)^2) + (\varkappa_i + 59)^2 - 80]$	$[-30, 30]$	30	-80
$BS5(\varkappa) = \sum_{i=1}^{n}(\ mod\ (\varkappa_i) + 60)^2 - 80$	$[-100, 100]$	30	-80
Multimodal benchmark problems			
$BS6(\varkappa) = -2Exp(-0.2\sqrt{\sum_{i=1}^{n}(\varkappa_i + 20)^2}) - exp(\frac{1}{n}\sum_{i=1}^{n}cos(2\pi(\varkappa_i + 20))) + 20 + e - 80$	$[-32, 32]$	30	-80
$BS7(\varkappa) = \frac{\pi}{n}\{10sin(\pi Y_1) + \sum_{i=1}^{n-1}(Y_i - 1)^2(1+$ $10sin^2(\pi Y_{i+1})) + (Y_i - 1)^2\} + \sum_{i=1}^{n}U((\varkappa_i + 30), 10, 100, 4) - 80$ $Y_i = 1 + \frac{(\varkappa_i + 30) + 1}{4}$ $U(\varkappa_i, b, c, d) = \begin{cases} c(\varkappa_i - b)^d; & \varkappa_i > b \\ 0; & -b < \varkappa_i < b \\ c(-\varkappa_i - b)^d; & \varkappa_i < -b \end{cases}$	$[-50, 50]$	30	-80
IEEE CEC 2019 [1]			
CH1	$[-8192, 8192]$	9	1
CH2	$[-16384, 16384]$	16	1
CH3	$[-4, 4]$	18	1
CH4$-$CH10	$[-100, 100]$	10	1
IEEE CEC 2014 [2] Unimodal			
CE1$-$CE3	$[-100, 100]$	30	$100-300$
IEEE CEC 2014 [2] Multimodal			
CE4$-$CE16	$[-100, 100]$	30	$400-1600$
IEEE CEC 2014 [2] Hybrid			
CE17$-$CE21	$[-100, 100]$	30	$1700-2100$
IEEE CEC 2014 [2] Composite			
CE22$-$CE25	$[-100, 100]$	30	$2700-3000$

Table S2: Comparative results of unimodal, multimodal and CEC-19 benchmark problems

Func	Metrics	AEFA	cAEFA1	cAEFA2	cAEFA3	cAEFA4	cAEFA5	cAEFA6	cAEFA7	cAEFA8	cAEFA9	cAEFA10
BS1	Best	2.2143E+02	-8.0000E+01	-7.9999E+01	-8.0000E+01	-8.0000E+01	-7.9999E+01	-8.0000E+01	-8.0000E+01	-8.000E+01	-8.0000E+01	-7.9999E+01
	Mean	1.3854E+03	-7.9998E+01	-7.9998E+01	-7.9999E+01	-7.9998E+01	-7.9997E+01	-7.9999E+01	-7.9998E+01	-7.9999E+01	-7.9999E+01	-7.9998E+01
	Std	1.0358E+03	1.2561E-03	1.5083E-03	5.9021E-04	8.2107E-04	1.6715E-03	6.2705E-04	2.9104E-03	3.9597E-04	5.2118E-04	7.3175E-04
	Rank	11	6	9	3	5	10	4	7	1	2	8
BS2	Best	2.1130E+05	6.5000E+01	1.1319E+02	1.1031E+03	2.6500E+02	3.3635E+02	2.9042E+02	3.5849E+02	-2.2426E+01	-4.2375E+01	1.9186E+02
	Mean	7.8199E+05	7.6818E+02	7.4659E+02	2.5609E+03	6.8296E+02	9.8028E+02	1.0039E+03	1.2474E+03	4.8202E+02	8.8861E+01	6.0298E+02
	Std	5.7296E+05	3.5623E+02	3.7985E+02	1.1779E+03	2.5663E+02	3.1810E+02	5.1220E+02	5.8941E+02	3.4458E+02	1.1469E+02	3.7323E+02
	Rank	11	3	4	10	6	8	7	9	2	1	5
BS3	Best	-3.6180E+01	-7.9974E+01	-7.9973E+01	-7.9944E+01	-7.9976E+01	-7.9962E+01	-7.9962E+01	-7.9952E+01	-7.9982E+01	-7.9979E+01	-7.9973E+01
	Mean	-2.7227E+01	-7.9797E+01	-7.9883E+01	-7.7618E+01	-7.9922E+01	-7.9855E+01	-7.9942E+01	-7.9684E+01	-7.9963E+01	-7.9966E+01	-7.9903E+01
	Std	4.0903E+00	7.8516E-01	3.7811E-01	3.1678E+00	1.0280E-01	3.3777E-01	2.1299E-02	7.3254E-01	1.0333E-02	8.4117E-03	1.8641E-01
	Rank	4	6	10	3	8	7	8	9	1	2	5
BS4	Best	4.0970E+02	-5.2861E+01	-5.3387E+01	-5.3316E+01	-5.3081E+01	-5.3048E+01	-5.3028E+01	-5.2987E+01	-5.4425E+01	-5.3988E+01	-5.4014E+01
	Mean	9.5938E+03	-4.8888E+01	-7.3986E+00	-8.1449E+00	-3.9364E+01	-2.0764E+01	-2.2912E+01	-2.0143E+01	-1.6770E+01	7.0246E+03	-2.2182E+01
	Std	1.1801E+04	1.6127E+01	1.0578E+02	9.8798E+01	4.9998E+01	6.6365E+01	8.6180E+01	1.2452E+02	1.0428E+02	3.5276E+04	8.6546E+01
	Rank	11	10	4	5	6	7	8	9	1	3	2
BS5	Best	5.1418E+03	-8.0000E+01	-8.0000E+01	-8.0000E+01	-7.9999E+01	-7.9999E+01	-7.9999E+01	-8.0000E+01	-8.0000E+01	-8.000E+01	-7.9999E+01
	Mean	1.0847E+04	-7.9998E+01	-7.9999E+01	-7.9999E+01	-7.9998E+01	-7.9997E+01	-7.9999E+01	-7.9997E+01	-7.9999E+01	-7.9999E+01	-7.9998E+01
	Std	3.6245E+03	1.2048E-03	8.9060E-04	1.3356E-03	1.0696E-03	1.0922E-03	7.2417E-04	7.1284E-03	3.1180E-04	2.5792E-04	7.6305E-04
	Rank	11	4	3	5	9	10	7	6	2	1	8
BS6	Best	-8.000E+01	-7.9980E+01	-7.9983E+01	-7.9985E+01	-7.9976E+01	-7.9966E+01	-7.9984E+01	-7.9982E+01	-7.9987E+01	-7.9985E+01	-7.9981E+01
	Mean	-7.6804E+01	-7.9681E+01	-7.9094E+01	-7.8953E+01	-7.9675E+01	-7.9529E+01	-7.9479E+01	-7.9100E+01	-7.9689E+01	-7.9112E+01	-7.9362E+01
	Std	2.1263E+00	1.4361E+00	2.4094E+00	2.6640E+00	1.4525E+00	1.8172E+00	1.5730E+00	2.3942E+00	1.4507E+00	2.3936E+00	2.0930E+00
	Rank	1	9	6	4	10	11	5	7	2	3	8
BS7	Best	-7.0673E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.0000E+01	-8.000E+01	-8.0000E+01
	Mean	4.4105E+04	-7.9954E+01	-7.9942E+01	-7.9619E+01	-7.9967E+01	-7.9947E+01	-7.9930E+01	-7.9983E+01	-7.9967E+01	-7.9983E+01	-7.9913E+01
	Std	9.1635E+04	7.9623E-02	1.4387E-01	7.5701E-01	5.7719E-02	1.5640E-01	1.4342E-01	3.8781E-02	1.0688E-01	3.8789E-02	9.7798E-02
	Rank	11	4	8	10	3	9	7	2	6	1	5
CH1	Best	3.4663E+11	3.6142E+08	1.0087E+08	3.6633E+08	2.3001E+08	5.6833E+08	1.4595E+07	4.7296E+08	4.0190E+07	2.9159E+08	3.6927E+07
	Mean	2.3292E+12	4.3724E+10	2.7647E+10	5.9493E+10	3.1931E+10	1.7831E+10	2.8602E+10	2.4696E+10	2.2596E+10	3.7552E+10	1.7781E+10
	Std	2.3560E+12	1.1308E+11	4.8898E+10	1.0108E+11	4.4157E+10	2.9927E+10	5.7363E+10	3.7521E+10	4.2999E+10	6.8174E+10	2.4749E+10
	Rank	11	7	4	8	5	10	1	9	3	6	2
CH2	Best	7.1032E+03	1.4473E+03	1.2115E+03	3.9905E+03	2.2553E+03	2.8720E+03	2.9606E+03	2.1584E+03	2.6885E+03	2.4583E+03	2.0723E+03
	Mean	1.4779E+04	5.5717E+03	5.3858E+03	6.3389E+03	5.6081E+03	6.2756E+03	5.9013E+03	4.9656E+03	5.2405E+03	5.3294E+03	5.5608E+03
	Std	4.0083E+03	1.5222E+03	1.9077E+03	1.3284E+03	1.8025E+03	1.7165E+03	1.7147E+03	1.7234E+03	1.5343E+03	1.4980E+03	1.7070E+03
	Rank	11	2	1	10	5	8	9	4	7	6	3
CH3	Best	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01
	Mean	1.2703E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01	1.2702E+01
	Std	3.8786E-04	3.1027E-05	3.7122E-05	4.1722E-05	1.3980E-04	3.1104E-06	1.3322E-09	4.3975E-06	2.2510E-05	3.1107E-06	3.1023E-05
	Rank	11	7	8	9	10	2	1	4	5	3	6
CH4	Best	9.9496E+00	2.9888E+00	5.9732E+00	2.9871E+00	1.009E+00	2.0147E+00	3.9832E+00	3.0039E+00	2.9884E+00	4.9766E+00	4.9799E+00
	Mean	7.9713E+01	1.0355E+01	1.0117E+01	7.2283E+00	9.0370E+00	7.1631E+00	9.3219E+00	9.4054E+00	8.2033E+00	1.0392E+01	1.0081E+01
	Std	8.4544E+01	5.3588E+00	4.8243E+00	4.0559E+00	4.2215E+00	3.1725E+00	3.4919E+00	3.8437E+00	3.4846E+00	3.6574E+00	3.2902E+00
	Rank	11	5	6	3	1	2	8	7	4	9	10
CH5	Best	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
	Mean	1.0034E+00	1.0025E+00	1.0047E+00	1.0050E+00	1.0041E+00	1.0029E+00	1.001E+00	1.0037E+00	1.0018E+00	1.0041E+00	1.0021E+00
	Std	5.2678E-03	6.6754E-03	7.6153E-03	7.3693E-03	7.4470E-03	5.9753E-03	2.7561E-03	6.2868E-03	4.4698E-03	7.3736E-03	4.3067E-03
	Rank	4	7	11	8	10	5	1	6	3	9	2
CH6	Best	1.000E+00	1.8662E+00	1.6748E+00	1.5128E+00	1.6994E+00	2.1500E+00	1.7962E+00	1.6537E+00	1.5366E+00	1.5875E+00	1.9624E+00
	Mean	1.1863E+00	2.4311E+00	2.2830E+00	1.9287E+00	2.4649E+00	2.6629E+00	2.3879E+00	2.3347E+00	2.0450E+00	2.1719E+00	2.7250E+00
	Std	5.1453E-01	4.6915E-01	4.3773E-01	4.3673E-01	4.8179E-01	3.4996E-01	4.9861E-01	5.3861E-01	3.9773E-01	5.4250E-01	6.9788E-01
	Rank	1	10	6	2	7	11	8	5	3	4	9
CH7	Best	5.2730E+01	-6.6301E+01	1.1491E+02	-1.1513E+02	-1.1519E+02	-4.6676E+01	5.0683E+01	-4.1646E+01	-4.8049E+01	3.4809E+01	1.0048E+02
	Mean	2.4429E+02	2.4419E+02	3.1590E+02	3.2068E+02	3.1906E+02	2.8212E+02	3.0417E+02	2.8280E+02	2.6920E+02	2.9905E+02	2.8989E+02
	Std	1.4349E+02	1.6010E+02	1.2098E+02	1.7937E+02	1.8161E+02	1.5834E+02	1.3866E+02	1.7021E+02	1.4567E+02	1.3797E+02	9.9917E+01
	Rank	9	3	11	1	2	5	8	6	4	7	10

Func	Metrics	AEFA	cAEFA1	cAEFA2	cAEFA3	cAEFA4	cAEFA5	cAEFA6	cAEFA7	cAEFA8	cAEFA9	cAEFA10
CH8	Best	3.7709E+00	1.3534E+00	1.3719E+00	1.3714E+00	1.1678E+00	1.2520E+00	1.3025E+00	1.2662E+00	1.1701E+00	1.4186E+00	1.2794E+00
	Mean	5.1325E+00	2.8641E+00	2.3993E+00	2.6806E+00	2.5029E+00	2.5833E+00	2.7471E+00	2.5677E+00	2.3922E+00	2.6308E+00	2.7198E+00
	Std	5.7155E-01	1.0748E+00	7.1334E-01	8.4868E-01	1.0146E+00	9.9341E-01	1.1216E+00	7.4111E-01	9.5474E-01	1.0075E+00	1.0154E+00
	Rank	11	7	9	8	1	3	6	4	2	10	5
CH9	Best	2.6520E+00	2.4376E+00	2.4695E+00	2.4079E+00	2.3972E+00	2.4481E+00	2.4047E+00	2.4822E+00	2.3709E+00	2.3745E+00	2.3934E+00
	Mean	3.4539E+00	2.6234E+00	2.6527E+00	3.1028E+00	2.5753E+00	2.5988E+00	2.5664E+00	2.7150E+00	2.5806E+00	2.4829E+00	2.5770E+00
	Std	5.2416E-01	1.6090E-01	1.3254E-01	4.2592E-01	1.7236E-01	1.1161E-01	1.0125E-01	1.8371E-01	1.6029E-01	9.5057E-02	1.3037E-01
	Rank	11	7	9	6	4	8	5	10	1	2	3
CH10	Best	1.1804E-12	4.6715E-03	3.3171E-03	5.7147E-03	4.9650E-03	9.6189E-03	4.3845E-03	6.6303E-03	3.4563E-03	4.4325E-03	5.1237E-03
	Mean	1.9185E+01	1.6013E+01	1.2003E+01	1.7600E+01	1.4402E+01	1.6806E+01	1.1203E+01	1.5202E+01	1.3605E+01	1.6005E+01	1.7610E+01
	Std	3.997E+00	8.1659E+00	9.9971E+00	6.6310E+00	9.1616E+00	7.4788E+00	1.0129E+01	8.7139E+00	9.5217E+00	8.1647E+00	6.6321E+00
	Rank	1	6	2	9	7	11	4	10	3	5	8

Table S3: Comparative results of CEC-14 benchmark problems with AEFA, 30*D*

Func	Metrics	AEFA	cAEFA1	cAEFA2	cAEFA3	cAEFA4	cAEFA5	cAEFA6	cAEFA7	cAEFA8	cAEFA9	cAEFA10
CE1	Best	2.0310E+08	3.3083E+06	3.0267E+06	1.1684E+07	2.6969E+06	4.7793E+06	4.7056E+06	4.5535E+06	3.0915E+06	1.5693E+06	4.1479E+06
	Mean	2.9239E+08	9.8578E+06	1.0685E+07	3.2257E+07	8.4536E+06	1.1958E+07	9.1727E+06	1.3740E+07	9.4832E+06	4.6451E+06	1.2239E+07
	Std	6.7140E+07	4.8437E+06	4.5905E+06	1.7249E+07	3.4755E+06	4.4097E+06	3.2125E+06	5.3155E+06	4.2317E+06	1.9036E+06	5.6382E+06
	Rank	11	5	3	10	2	9	8	7	4	1	6
CE2	Best	1.2335E+09	2.6876E+03	1.2141E+03	1.9678E+03	1.9439E+03	1.9073E+03	2.2635E+03	4.0868E+03	1.4378E+03	2.9463E+03	3.2580E+03
	Mean	6.5424E+09	1.1980E+04	1.2320E+04	1.2483E+04	1.6032E+04	1.5564E+04	1.4157E+04	1.3187E+04	1.1437E+04	1.1043E+04	1.3692E+04
	Std	3.5070E+09	6.3041E+03	7.2856E+03	8.3925E+03	8.2518E+03	1.3783E+04	8.8408E+03	6.1567E+03	6.3496E+03	4.7453E+03	8.3692E+03
	Rank	11	7	1	5	4	3	6	10	2	8	9
CE3	Best	6.3875E+04	2.3375E+04	1.2465E+04	5.2652E+04	1.5146E+04	3.2800E+04	1.4896E+04	2.0775E+04	1.7398E+04	7.7706E+03	2.0656E+04
	Mean	8.8447E+04	5.1141E+04	4.3939E+04	8.0436E+04	4.1927E+04	5.0430E+04	4.3576E+04	4.6082E+04	4.1062E+04	3.103E+04	4.7832E+04
	Std	1.1594E+04	1.5364E+04	1.8126E+04	1.5258E+04	1.7007E+04	1.1799E+04	1.0719E+04	1.7493E+04	1.4525E+04	1.7060E+04	1.4744E+04
	Rank	11	8	2	10	4	9	3	7	5	1	6
CE4	Best	7.3349E+02	4.7355E+02	4.7573E+02	4.9465E+02	4.7748E+02	4.8195E+02	4.7322E+02	4.7330E+02	4.7739E+02	4.7143E+02	4.7883E+02
	Mean	1.3512E+03	5.1280E+02	5.1438E+02	5.3005E+02	5.1262E+02	5.2337E+02	5.1496E+02	5.1794E+02	5.1527E+02	5.073E+02	5.1057E+02
	Std	4.3791E+02	1.752E+01	2.0701E+01	1.9744E+01	1.9206E+01	1.9061E+01	2.3697E+01	2.0754E+01	2.2733E+01	2.3089E+01	2.3563E+01
	Rank	11	4	5	10	7	9	3	2	6	1	8
CE5	Best	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.200E+02	5.2000E+02
	Mean	5.2002E+02	5.2000E+02	5.2000E+02	5.2000E+02	5.2001E+02	5.2001E+02	5.2001E+02	5.2001E+02	5.2000E+02	5.200E+02	5.2000E+02
	Std	3.1520E-02	3.9238E-03	6.9650E-03	2.5532E-03	5.7652E-03	6.6789E-03	3.6279E-03	1.1867E-02	1.0117E-03	9.1789E-04	2.0105E-03
	Rank	11	6	9	4	7	8	5	10	2	1	3
CE6	Best	6.1937E+02	6.0038E+02	6.0035E+02	6.0078E+02	6.0037E+02	6.0055E+02	6.0045E+02	6.0040E+02	6.0035E+02	6.0140E+02	6.0093E+02
	Mean	6.2324E+02	6.0320E+02	6.0291E+02	6.0380E+02	6.0363E+02	6.0330E+02	6.0291E+02	6.0376E+02	6.0323E+02	6.0334E+02	6.0337E+02
	Std	2.3977E+00	1.7557E+00	1.8995E+00	1.7489E+00	2.3923E+00	1.7064E+00	1.6772E+00	2.0538E+00	2.0644E+00	1.0808E+00	1.6213E+00
	Rank	11	4	1	8	3	7	6	5	2	10	9
CE7	Best	7.2606E+02	7.0000E+02	7.0000E+02	7.0000E+02	7.0000E+02	7.0001E+02	7.0000E+02	7.0000E+02	7.0000E+02	7.000E+02	7.0000E+02
	Mean	7.7928E+02	7.0001E+02	7.0001E+02	7.0001E+02	7.0001E+02	7.0002E+02	7.0001E+02	7.0001E+02	7.0000E+02	7.000E+02	7.0001E+02
	Std	3.3575E+01	6.3309E-03	5.7105E-03	8.2244E-03	5.1037E-03	2.1947E-02	1.1267E-02	9.4603E-03	2.5023E-03	2.0941E-03	4.5242E-03
	Rank	11	6	5	7	4	9	10	8	2	1	3
CE8	Best	8.7719E+02	8.1592E+02	8.1990E+02	8.1592E+02	8.2090E+02	8.1692E+02	8.2089E+02	8.1990E+02	8.2089E+02	8.1990E+02	8.1791E+02
	Mean	9.1216E+02	8.3240E+02	8.3650E+02	8.3211E+02	8.3371E+02	8.3520E+02	8.3522E+02	8.3554E+02	8.3220E+02	8.3181E+02	8.3439E+02
	Std	1.6617E+01	6.9712E+00	9.4944E+00	8.8948E+00	7.9089E+00	7.2221E+00	9.6723E+00	9.3975E+00	7.8600E+00	7.2449E+00	8.3000E+00
	Rank	11	1	7	2	10	3	9	6	8	5	4
CE9	Best	9.9943E+02	9.1890E+02	9.2089E+02	9.1890E+02	9.2587E+02	9.1891E+02	9.1493E+02	9.1990E+02	9.0995E+02	9.1791E+02	9.2189E+02
	Mean	1.0241E+03	9.3578E+02	9.3522E+02	9.3383E+02	9.3526E+02	9.3403E+02	9.3314E+02	9.3343E+02	9.3172E+02	9.3395E+02	9.3622E+02
	Std	1.3999E+01	1.1022E+01	8.5348E+00	8.9038E+00	6.0938E+00	1.1034E+01	1.0274E+01	8.0216E+00	9.8005E+00	9.7099E+00	1.0016E+01
	Rank	11	5	8	4	10	6	2	7	1	3	9
CE10	Best	3.5495E+03	2.6078E+03	2.2944E+03	2.1931E+03	2.6337E+03	2.3515E+03	2.2454E+03	2.6248E+03	2.7279E+03	2.8338E+03	2.3704E+03
	Mean	4.5388E+03	3.4217E+03	3.3588E+03	3.3949E+03	3.4119E+03	3.3111E+03	3.5424E+03	3.5561E+03	3.7067E+03	3.7863E+03	3.1494E+03
	Std	6.3505E+02	5.9263E+02	4.7416E+02	6.1388E+02	5.1831E+02	5.9986E+02	5.9733E+02	5.5948E+02	5.8297E+02	6.1547E+02	5.0153E+02
	Rank	11	6	3	1	8	4	2	7	9	10	5
CE11	Best	3.5706E+03	2.4022E+03	2.025E+03	2.4939E+03	2.9237E+03	2.5198E+03	2.2464E+03	3.0705E+03	2.5345E+03	2.6719E+03	2.3256E+03
	Mean	5.1584E+03	3.6535E+03	3.8247E+03	3.7696E+03	3.9275E+03	3.7189E+03	3.6866E+03	3.9025E+03	3.5552E+03	3.7885E+03	3.6109E+03
	Std	6.8483E+02	6.5836E+02	6.1564E+02	7.2376E+02	6.9410E+02	5.5719E+02	6.5601E+02	5.6224E+02	6.2590E+02	6.1712E+02	6.3626E+02
	Rank	11	4	1	5	9	6	2	10	7	8	3
CE12	Best	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.200E+03	1.2000E+03
	Mean	1.2001E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2000E+03	1.2E+03	1.2000E+03
	Std	6.5461E-02	9.1816E-03	9.3835E-03	1.7356E-02	7.3422E-03	1.0428E-02	6.6236E-03	1.1504E-02	1.1783E-02	6.34E-03	8.8698E-03
	Rank	11	5	6	10	3	7	2	8	9	1	4
CE13	Best	1.3003E+03	1.3002E+03	1.3002E+03	1.3002E+03	1.3001E+03	1.3002E+03	1.3001E+03	1.3001E+03	1.3001E+03	1.3001E+03	1.3001E+03
	Mean	1.3022E+03	1.3002E+03	1.3003E+03	1.3003E+03	1.3002E+03	1.3003E+03	1.3002E+03	1.3003E+03	1.3003E+03	1.3002E+03	1.3002E+03
	Std	9.6374E-01	5.0262E-02	5.9819E-02	7.0595E-02	5.9167E-02	6.1522E-02	6.5987E-02	6.7435E-02	7.1357E-02	5.2483E-02	6.9294E-02
	Rank	11	7	8	10	2	9	3	4	6	1	5
CE14	Best	1.4003E+03	1.4004E+03	1.4003E+03	1.4003E+03	1.4003E+03	1.4003E+03	1.4004E+03	1.4003E+03	1.4004E+03	1.4003E+03	1.4003E+03
	Mean	1.4324E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03	1.4004E+03
	Std	1.3376E+01	3.8953E-02	6.8971E-02	4.6439E-02	4.4599E-02	5.9337E-02	2.8405E-02	5.1770E-02	4.4837E-02	4.4770E-02	3.4777E-02
	Rank	7	10	8	4	2	6	9	5	11	3	1

Func	Metrics	AEFA	cAEFA1	cAEFA2	cAEFA3	cAEFA4	cAEFA5	cAEFA6	cAEFA7	cAEFA8	cAEFA9	cAEFA10
CE15	Best	1.6115E+03	1.5024E+03	1.5033E+03	1.5035E+03	1.5026E+03	1.5025E+03	1.5021E+03	1.5029E+03	1.5027E+03	1.5023E+03	1.5029E+03
	Mean	2.3958E+03	1.5045E+03	1.5059E+03	1.5076E+03	1.5049E+03	1.5046E+03	1.5043E+03	1.5054E+03	1.5043E+03	1.5044E+03	1.5054E+03
	Std	6.9362E+02	1.2256E+00	2.2205E+00	3.5955E+00	1.8257E+00	1.5980E+00	1.1430E+00	2.7772E+00	1.0864E+00	1.058E+00	3.2003E+00
	Rank	11	3	9	10	5	4	1	7	6	2	8
CE16	Best	1.6127E+03	1.6131E+03	1.6129E+03	1.6131E+03	1.6133E+03	1.6131E+03	1.6126E+03	1.6131E+03	1.6131E+03	1.6130E+03	1.6131E+03
	Mean	1.6136E+03	1.6136E+03	1.6136E+03	1.6137E+03	1.6137E+03	1.6137E+03	1.6136E+03	1.6137E+03	1.6137E+03	1.6137E+03	1.6137E+03
	Std	3.4863E-01	2.4346E-01	2.6914E-01	2.2548E-01	2.3272E-01	2.7970E-01	3.0363E-01	2.5654E-01	2.8944E-01	3.0163E-01	2.4370E-01
	Rank	2	11	4	5	10	8	1	7	9	3	6
CE17	Best	1.2472E+07	2.3713E+05	1.7255E+05	2.7523E+05	1.9192E+04	2.0957E+05	2.1183E+05	3.6335E+05	1.6611E+05	9.7352E+04	7.3496E+04
	Mean	3.5862E+07	9.7355E+05	1.0878E+06	2.4456E+06	8.6809E+05	1.4651E+06	9.7825E+05	1.2375E+06	6.5282E+05	5.2593E+05	8.9046E+05
	Std	1.6654E+07	5.2084E+05	6.0793E+05	1.5163E+06	5.2808E+05	8.9086E+05	5.4104E+05	5.8694E+05	3.6464E+05	3.6639E+05	5.9076E+05
	Rank	11	5	8	9	1	6	7	10	4	3	2
CE18	Best	2.0724E+03	1.959E+03	1.9776E+03	2.0335E+03	2.0006E+03	1.9829E+03	1.9987E+03	2.0229E+03	1.9611E+03	2.0252E+03	2.0117E+03
	Mean	3.2376E+03	2.7658E+03	3.0388E+03	3.3022E+03	2.9473E+03	2.9482E+03	2.9243E+03	3.0774E+03	2.5387E+03	3.1226E+03	3.0253E+03
	Std	3.6872E+03	9.2746E+02	1.3092E+03	1.3731E+03	1.2830E+03	1.7469E+03	1.3508E+03	1.1460E+03	4.930E+02	1.1741E+03	9.8882E+02
	Rank	11	1	3	10	6	4	5	8	2	9	7
CE19	Best	1.9611E+03	1.9074E+03	1.9088E+03	1.9101E+03	1.9091E+03	1.9085E+03	1.9092E+03	1.9083E+03	1.9085E+03	1.9450E+03	1.9102E+03
	Mean	2.0320E+03	1.9127E+03	1.9128E+03	1.9140E+03	1.9148E+03	1.9122E+03	1.9124E+03	1.9143E+03	1.9174E+03	3.3587E+03	1.9150E+03
	Std	4.0107E+01	2.4645E+00	2.0416E+00	2.6527E+00	1.1457E+01	2.2927E+00	2.2759E+00	1.2301E+01	1.5818E+01	1.2087E+03	1.1104E+01
	Rank	11	1	5	8	6	4	7	2	3	10	9
CE20	Best	9.2237E+04	1.3846E+04	1.1591E+04	3.1722E+04	1.8139E+04	2.0936E+04	1.2742E+04	1.8570E+04	1.0722E+04	1.1477E+04	1.4190E+04
	Mean	4.0415E+05	2.9251E+04	3.2298E+04	7.1004E+04	3.1879E+04	3.1906E+04	3.4559E+04	3.6484E+04	2.9989E+04	2.6474E+04	2.9575E+04
	Std	3.7475E+05	1.1758E+04	9.7364E+03	3.7473E+04	8.1816E+03	8.5990E+03	1.3325E+04	1.2654E+04	1.0111E+04	9.6608E+03	9.9803E+03
	Rank	11	5	3	10	7	9	4	8	1	2	6
CE21	Best	3.8447E+06	4.6840E+04	8.3585E+04	1.2508E+05	9.1069E+04	8.4528E+04	7.4250E+04	5.0339E+04	1.4761E+04	6.7281E+04	2.0678E+04
	Mean	1.4944E+07	2.3425E+05	3.0846E+05	5.5060E+05	2.3554E+05	3.1851E+05	2.6643E+05	3.1857E+05	2.6810E+05	2.0364E+05	2.1052E+05
	Std	8.3201E+06	1.2215E+05	2.2043E+05	6.9831E+05	1.2913E+05	2.0276E+05	1.7825E+05	2.6844E+05	1.4718E+05	1.3745E+05	1.3690E+05
	Rank	11	3	7	10	9	8	6	4	1	5	2
CE22	Best	3.3920E+03	3.0113E+03	3.1032E+03	3.0497E+03	3.0290E+03	3.0508E+03	3.0414E+03	3.0491E+03	3.0588E+03	3.0402E+03	3.0112E+03
	Mean	4.1946E+03	3.1419E+03	3.1479E+03	3.1957E+03	3.1916E+03	3.1618E+03	3.2092E+03	3.1764E+03	3.1543E+03	3.1634E+03	3.1520E+03
	Std	4.8041E+02	7.0913E+01	6.9862E+01	1.1166E+02	8.8697E+01	8.6524E+01	1.3391E+02	1.0441E+02	7.3367E+01	8.8656E+01	8.0837E+01
	Rank	11	2	10	6	3	7	5	8	9	4	1
CE23	Best	5.2467E+03	3.601E+03	3.6263E+03	3.6756E+03	3.6842E+03	3.6271E+03	3.6466E+03	3.6338E+03	3.6627E+03	3.6895E+03	3.6548E+03
	Mean	6.9581E+03	4.0161E+03	4.0667E+03	4.0583E+03	4.0974E+03	3.9052E+03	3.9327E+03	4.0389E+03	4.0525E+03	3.9658E+03	4.0019E+03
	Std	1.0666E+03	4.6573E+02	4.9053E+02	3.6437E+02	4.5374E+02	3.6633E+02	3.7702E+02	3.8815E+02	4.3795E+02	3.3925E+02	4.2351E+02
	Rank	11	1	2	8	9	3	5	4	7	10	6
CE24	Best	7.4350E+03	5.4233E+03	5.9053E+03	6.6362E+03	4.8673E+03	5.3368E+03	5.0563E+03	4.9144E+03	4.5056E+03	4.4512E+03	4.8968E+03
	Mean	1.0040E+08	7.8133E+03	8.4122E+03	1.2777E+04	6.7196E+03	7.4523E+03	7.0746E+03	8.1821E+03	6.3592E+03	6.0065E+03	7.5322E+03
	Std	1.2786E+08	2.0557E+03	1.8373E+03	3.8545E+03	1.0717E+03	1.7326E+03	1.2675E+03	2.9026E+03	9.1510E+02	8.8482E+02	1.2400E+03
	Rank	11	8	9	10	3	7	6	5	2	1	4
CE25	Best	4.7904E+05	1.0180E+04	7.5950E+03	1.4773E+04	8.3903E+03	7.6856E+03	7.7712E+03	7.8990E+03	8.1650E+03	6.6633E+03	7.3378E+03
	Mean	1.2323E+06	1.4208E+04	1.2267E+04	3.1627E+04	1.3159E+04	1.5822E+04	1.2728E+04	1.3739E+04	1.1270E+04	9.3263E+03	1.3187E+04
	Std	3.7605E+05	3.5029E+03	2.8752E+03	1.5119E+04	4.8454E+03	1.0397E+04	4.5239E+03	6.0390E+03	2.2731E+03	1.9953E+03	6.4458E+03
	Rank	1.1000E+01	9.0000E+00	3.0000E+00	1.0000E+01	8.0000E+00	4.0000E+00	5.0000E+00	6.0000E+00	7.0000E+00	1.0000E+00	2.0000E+00

Table S4: Experimental accuracy (%) results of all selected algorithms on high-dimensional datasets [3].

Data Set	cAEFA	SPSO	SaDE	SaPSO	SaWDE
Grammatical	**9.25E+01**	9.13E+01	9.03E+01	9.16E+01	**9.25E+01**
Armstrong-v1	**9.80E+01**	9.05E+01	9.52E+01	9.11E+01	9.05E+01
HAPT	9.57E+01	9.53E+01	9.39E+01	9.69E+01	**9.70E+01**
Shipp-v1	**9.26E+01**	7.39E+01	8.26E+01	7.80E+01	8.70E+01
Alizadeh-v2	**1.00E+02**	9.44E+01	**1.00E+02**	8.89E+01	**1.00E+02**
Indoor	**1.00E+02**	**1.00E+02**	**1.00E+02**	**1.00E+02**	**1.00E+02**

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