

Supplemental file

Table Captions

- **Table S1** EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES. “MEAN OFV” AND “STD DEV” INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON’S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.
- **TABLE S2** EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. “MEAN OFV” AND “STD DEV” INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON’S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.
- **Table S3** EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. “MEAN OFV” AND “STD DEV” INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON’S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.
- **Table S4** COMPARISON OF FROFI WITH RESPECT TO ϵ DE [47], APF-GA [69], $(\mu+\lambda)$ -CDE [31], DYHF [56], AND CMODE [57] IN TERMS OF THE SUCCESS RATE. IN ALL THE EXPERIMENTS, 25 INDEPENDENT RUNS WERE IMPLEMENTED ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES.
- **Table S5** COMPARISON OF FROFI WITH RESPECT TO ϵ DE [47], APF-GA [69], $(\mu+\lambda)$ -CDE [31], DYHF [56], AND CMODE [57] IN TERMS OF THE SUCCESS PERFORMANCE. IN ALL THE EXPERIMENTS, 25 INDEPENDENT RUNS WERE IMPLEMENTED ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES.
- **Table S6** EXPERIMENTAL RESULTS OF ϵ DEAG [51], SRS- ϵ DEAG [50], ECHT-DE [72], AIS-IRP [40], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. “MEAN OFV” AND “STD DEV” INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. t -TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF ϵ DEAG, SRS- ϵ DEAG, ECHT-DE, AND AIS-IRP.
- **Table S7** EXPERIMENTAL RESULTS OF DYHF [56], CMODE [57], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. “MEAN OFV” AND “STD DEV” INDICATE THE AVERAGE AND

STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF DYHF AND CMODE.

- **Table S8** EXPERIMENTAL RESULTS OF ϵ DEAG [51], SRS- ϵ DEAG [50], ECHT-DE [72], AIS-IRP [40], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. t -TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF ϵ DEAG, SRS- ϵ DEAG, ECHT-DE, AND AIS-IRP.
- **Table S9** EXPERIMENTAL RESULTS OF DYHF [56], CMODE [57], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF DYHF AND CMODE.
- **Table S10** EXPERIMENTAL RESULTS OF FROFI_WoR AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND FROFI_WoR.
- **Table S11** EXPERIMENTAL RESULTS OF FROFI_WoR AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND FROFI_WoR.
- **Table S12** EXPERIMENTAL RESULTS OF FROFI_13, FROFI_14, FROFI_15, FROFI_16, AND FROFI_17 OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY.

TABLE S1

EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.

Test Function from IEEE CEC2006	FROFI_FR Mean OFV±Std Dev	FROFI_MO Mean OFV±Std Dev	FROFI Mean OFV±Std Dev
g01	-15.0000E+01±0.00E+00≈	-6.3245E+01±1.00E+01—(0%)*	-15.0000E+01±0.00E+00
g02	-8.0323E-01±2.21E-03—	-8.0283E-01±2.75E-03—	-8.0362E-01±1.78E-07
g03	-5.1685E-01±1.04E-01—	-8.3141E-01±3.58E-01—(56%)*	-1.0005E+00±4.49E-16
g04	-3.066553E+04±3.71E-12≈	-3.066553E+04±3.71E-12≈	-3.066553E+04±3.71E-12
g05	5.1264967E+03±2.63E-05≈	4.756954E+03±4.75E+02—(0%)*	5.1264967E+03±2.78E-12
g06	-6.9618138E+03±0.00E+00≈	-6.5993020E+03±1.57E+00—	-6.961813E+03±0.00E+00
g07	2.430621E+01±8.14E-15≈	2.431041E+01±9.312E-03—	2.430621E+01±6.32E-15
g08	-9.5825E+02±1.42E-17≈	-9.5825E+02±7.68E-07≈	-9.5825E+02±1.42E-17
g09	6.8063006E+02±2.49E-13≈	6.8063006E+02±3.63E-13≈	6.8063006E+02±3.64E-13
g10	7.0492480E+03±1.99E-12≈	6.5800367E+03±1.41E+03—(8%)*	7.0492480E+03±3.26E-12
g11	7.499E-01±5.53E-05≈	7.504E-01±5.96E-04—	7.499E-01±1.13E-16
g12	-1.00E+00±0.00E+00≈	-1.00E+00±0.00E+00≈	-1.00E+00±0.00E+00
g13	8.1063E-01±1.00E-01—(96%)*	1.0399E-01±9.88E-02—(0%)*	5.3942E-02±2.41E-17
g14	-4.776489E+01±2.90E-14≈	-6.067545E+02±6.41E+01—(0%)*	-4.776489E+01±2.34E-14
g15	9.6171502E+02±5.80E-13≈	9.6119367E+02±1.90E+00—(0%)*	9.617150E+02±5.80E-13
g16	-1.90516E+00±4.53E-16≈	-1.89874E+00±8.18E-03—(96%)*	-1.90516E+00±4.53E-16
g17	8.8774789E+03±3.55E+01—	8.4253151E+03±3.70E+02—(0%)*	8.853533E+03±0.00E+00
g18	-8.660254E-01±4.79E-15≈	-1.181442E+01±3.89E+00—(0%)*	-8.66025E-01±6.94E-16
g19	3.265559E+01±2.12E-14≈	3.265559E+01±2.18E-14≈	3.265559E+01±2.18E-14
g20	2.048E-01±1.82E-04≈(0%)*	6.051E-02±5.22E-03—(0%)*	2.049E-01±5.31E-05(0%)*
g21	1.9372451E+02±1.54E-11≈	1.0332682E+02±5.18E+01—(0%)*	1.937245E+02±2.95E-11
g22	—	—	—
g23	-4.000551E+02±1.28E-13≈	-1.594065E+03±2.41E+02—(0%)*	-4.000551E+02±1.71E-13
g24	-5.50801E+00±9.06E-16≈	-5.50801E+00±9.06E-16≈	-5.50801E+00±9.06E-16
—	4	17	
+	0	0	
≈	19	6	

“—”, “+”, and “≈” denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. “*” denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S2

EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.

Test Function with 10D from IEEE CEC2010	FROFI_FR Mean OFV±Std Dev	FROFI_MO Mean OFV±Std Dev	FROFI Mean OFV±Std Dev
C01	-7.47E-01±1.4E-13≈	-7.47E-01±1.4E-03≈	-7.47E-01±1.35E-03
C02	2.26E+00±1.19E-01—(88%)*	1.10E+00±1.50E+00—(68%)*	-2.02E+00±1.41E-01
C03	0.00E+00±0.00E+00≈	8.52E+00±1.8E+00—	0.00E+00±0.00E+00
C04	-1.00E-05±0.00E+00≈	-2.97E-01±3.31E-01—(0%)*	-1.00E-05±0.00E+00
C05	3.85E+02±1.48E+02—(0%)*	2.25E+02±1.10E+02—(0%)*	-4.84E+02±8.09E-07
C06	3.20E+02±1.92E+02—(0%)*	7.79E+01±1.80E+02—(0%)*	-5.79E+02±5.04E-04
C07	0.00E+00±0.00E+00≈	0.00E+00±0.00E+00≈	0.00E+00±0.00E+00
C08	7.84E+00±4.98E+00≈	7.34E+00±5.14E+00≈	7.11E+00±4.79E+00
C09	8.59E+12±4.64E+12—(0%)*	5.44E+11±6.92E+11—(0%)*	2.50E+01±3.92E+01
C10	9.65E+12±6.63E+12—(0%)*	1.29E+12±2.66E+12—(0%)*	4.17E+01±8.69E-06
C11	-1.52E-03±2.00E-18≈	-1.94E+01±4.38E+00—(0%)*	-1.52E-03±5.63E-14
C12	-8.23E+13±1.52E+02—(60%)*	-1.82E+03±2.86E+02—(0%)*	-3.84E+02±2.17E+02
C13	-6.84E+01±2.90E-09≈	-5.81E+01±9.06E+00—(36%)*	-6.84E+01±2.52E-09
C14	9.45E+10±1.18E+11—	1.85E+00±5.46E+00—	0.00E+00±0.00E+00
C15	3.12E+13±1.72E+13—	3.71E+11±4.29E+11—	3.09E+00±1.37E+00
C16	1.05E+00±3.03E-02—(64%)*	7.61E-01±2.66E-01—(28%)*	1.19E-02±2.07E-02
C17	5.07E+02±2.42E+02—(52%)*	8.44E+01±7.18E+01—(40%)*	7.83E-02±2.25E-01
C18	1.01E+04±4.79E+03—(92%)*	2.59E+03±1.98E+03—(44%)*	5.23E-26±1.71E-25
—	11	15	
+	0	0	
≈	7	3	

“—”, “+”, and “≈” denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. “*” denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S3

EXPERIMENTAL RESULTS OF FROFI_FR, FROFI_MO, AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF FROFI_FR AND FROFI_MO.

Test Function with 30D from IEEE CEC2010	FROFI_FR	FROFI_MO	FROFI
	Mean OFV±Std Dev	Mean OFV±Std Dev	Mean OFV±Std Dev
C01	-8.21E-01±1.5E-03≈	-8.21E-01±1.69E-03≈	-8.21E-01±2.36E-03
C02	3.40E+00±8.15E-01—	2.65E+00±6.07E-01—	-2.00E+00±4.35E-02
C03	1.89E+12±7.45E+12—	2.87E+01±3.02E-04—(96%)*	2.87E+01±6.24E-08
C04	2.60E-02±1.30E-02—	-6.57E-01±1.11E-01—(0%)*	-3.33E-06±4.13E-10
C05	5.30E+02±5.09E+01—(0%)*	4.10E+02±8.51E+01—(0%)*	-4.81E+02±2.84E+00
C06	5.57E+02±4.25E+01—(0%)*	4.25E+02±7.66E+01—(0%)*	-5.29E+02±5.71E-01
C07	1.60E+00±7.97E-01—	0.00E+00±0.00E+00≈	0.00E+00±0.00E+00
C08	3.67E+00±1.84E+01—	5.57E-30±2.79E-29—	0.00E+00±0.00E+00
C09	3.83E+13±1.10E+13—(4%)*	1.02E+13±5.24E+12—(0%)*	4.30E+01±3.27E+01
C10	3.23E+13±1.17E+12—(8%)*	1.11E+13±6.95E+12—(4%)*	3.13E+01±8.22E-02
C11	-3.92E-04±2.64E-06≈	-1.40E+01±3.00E+00—(0%)*	-3.92E-04±2.64E-06
C12	6.37E+01±2.81E+02—(28%)*	-5.46E+03±7.19E+02—(0%)*	-1.99E-01±1.42E-06
C13	-6.23E+01±1.50E+00—	-7.48E+01±8.66E+00—(0%)*	-6.83E+01±1.95E-01
C14	3.56E+07±1.23E+08—	1.47E+01±4.84E+00—	9.80E-29±4.90E-28
C15	1.66E+14±4.79E+13—	2.74E+13±1.22E+13—	2.16E+01±8.03E-05
C16	1.18E+00±3.46E-02—(40%)*	1.06E+00±2.57E-02—(32%)*	0.00E+00±0.00E+00
C17	1.76E+03±4.89E+02—(76%)*	6.63E+02±2.83E+02—(44%)*	1.59E-01±3.82E-01
C18	2.87E+04±5.26E+03—	1.44E+04±6.15E+03—(92%)*	4.87E-01±1.25E+00
—	16	16	
+	0	0	
≈	2	2	

“—”, “+”, and “≈” denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. “*” denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S4
 COMPARISON OF FROFI WITH RESPECT TO ϵ DE [47], APF-GA [69], $(\mu+\lambda)$ -CDE [31], DyHF [56], AND CMODE [57] IN TERMS OF THE SUCCESS RATE. IN ALL THE EXPERIMENTS, 25 INDEPENDENT RUNS WERE IMPLEMENTED ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES.

Test Function from IEEE CEC2006	Success Rate					
	ϵ DE	APF-GA	$(\mu+\lambda)$ -CDE	DyHF	CMODE	FROFI
g01	100%	100%	100%	100%	100%	100%
g02	100%	60%	96%	100%	100%	100%
g03	100%	100%	100%	100%	100%	100%
g04	100%	100%	100%	100%	100%	100%
g05	100%	55%	100%	100%	100%	100%
g06	100%	100%	100%	100%	100%	100%
g07	100%	100%	100%	100%	100%	100%
g08	100%	100%	100%	100%	100%	100%
g09	100%	100%	100%	100%	100%	100%
g10	100%	55%	100%	100%	100%	100%
g11	100%	100%	100%	100%	100%	100%
g12	100%	100%	100%	100%	100%	100%
g13	100%	70%	100%	100%	100%	100%
g14	100%	64%	100%	100%	100%	100%
g15	100%	100%	100%	100%	100%	100%
g16	100%	80%	100%	100%	100%	100%
g17	100%	36%	100%	100%	100%	100%
g18	100%	96%	100%	100%	100%	100%
g19	100%	100%	100%	100%	100%	100%
g20	0%	0%	100%	0%	100%	100%
g21	100%	0%	92%	100%	80%	100%
g22	0%	0%	0%	0%	0%	0%
g23	100%	0%	100%	100%	100%	100%
g24	100%	100%	100%	100%	100%	100%
Mean	91.67%	71.50%	95.33%	91.67%	95.00%	95.83%

TABLE S5

COMPARISON OF FROFI WITH RESPECT TO ϵ DE [47], APF-GA [69], $(\mu+\lambda)$ -CDE [31], DyHF [56], AND CMODE [57] IN TERMS OF THE SUCCESS PERFORMANCE. IN ALL THE EXPERIMENTS, 25 INDEPENDENT RUNS WERE IMPLEMENTED ON 24 TEST FUNCTIONS FROM IEEE CEC2006 USING 5×10^5 FES.

Test Function from IEEE CEC2006	Success Performance					
	ϵ DE	APF-GA	$(\mu+\lambda)$ -CDE	DyHF	CMODE	FROFI
g01	5.9E+04	4.2E+05	8.9E+04	6.9E+04	1.2E+05	3.8E+04
g02	1.5E+05	6.8E+05	2.7E+05	1.1E+05	1.9E+05	8.5E+04
g03	8.9E+04	2.3E+05	1.1E+05	4.3E+04	7.5E+04	6.3E+04
g04	2.6E+04	2.6E+05	3.0E+04	4.0E+04	7.3E+04	2.5E+04
g05	9.7E+04	5.7E+05	1.6E+05	4.7E+04	2.9E+04	3.1E+04
g06	7.4E+03	2.0E+05	1.1E+04	3.8E+04	3.5E+04	1.5E+04
g07	7.4E+04	2.2E+05	1.4E+05	9.4E+04	1.6E+05	7.2E+04
g08	1.1E+03	5.7E+04	2.0E+03	1.2E+03	5.9E+03	2.4E+03
g09	2.3E+04	5.3E+04	4.0E+04	4.1E+04	7.1E+04	3.2E+04
g10	1.1E+05	2.9E+05	1.8E+05	1.4E+05	1.8E+05	1.0E+05
g11	1.6E+04	2.2E+05	7.9E+04	5.8E+03	6.0E+03	1.2E+04
g12	4.1E+03	1.1E+05	4.9E+03	3.0E+03	5.0E+03	3.5E+03
g13	3.5E+04	1.1E+05	1.4E+05	3.2E+04	3.1E+04	4.1E+04
g14	1.1E+05	2.4E+05	1.7E+05	6.5E+04	1.1E+05	6.6E+04
g15	8.4E+04	1.8E+04	1.3E+05	2.3E+04	1.3E+04	1.9E+04
g16	1.3E+04	4.9E+04	1.9E+04	3.0E+04	2.9E+04	1.8E+04
g17	9.9E+04	3.2E+05	1.8E+05	2.1E+05	1.4E+05	1.3E+05
g18	5.9E+04	2.2E+05	2.1E+05	8.9E+04	1.1E+05	9.6E+04
g19	3.5E+05	2.6E+04	2.6E+05	1.1E+05	2.5E+05	1.2E+05
g20	<i>NA</i>	<i>NA</i>	1.4E+05	<i>NA</i>	4.4E+05	4.7E+05
g21	1.4E+05	<i>NA</i>	2.1E+05	1.0E+05	1.3E+05	9.4E+04
g22	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
g23	2.0E+05	<i>NA</i>	2.6E+05	1.6E+05	2.4E+05	1.7E+05
g24	3.0E+03	1.9E+05	5.0E+03	1.4E+04	2.2E+04	5.7E+03

TABLE S6

EXPERIMENTAL RESULTS OF ϵ DEAG [51], SRS- ϵ DEAG [50], ECHT-DE [72], AIS-IRP [40], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. t -TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF ϵ DEAG, SRS- ϵ DEAG, ECHT-DE, AND AIS-IRP.

Test Function with 10D from IEEE CEC2010	ϵ DEAg Mean OFV \pm Std Dev	SRS- ϵ DEAg Mean OFV \pm Std Dev	ECHT-DE Mean OFV \pm Std Dev	AIS-IRP Mean OFV \pm Std Dev	FROFI Mean OFV \pm Std Dev
C01	-7.47E-01 \pm 1.32E-03 \approx	-7.47E-01 \pm 2.82E-03 \approx	-7.47E-01 \pm 1.40E-03 \approx	-7.47E-01 \pm 1.30E-03 \approx	-7.47E-01 \pm 1.35E-03
C02	-2.26E+00 \pm 2.39E-02+	-2.27E+00 \pm 1.28E-02+	-2.27E+00 \pm 6.70E-03+	-2.27E+00 \pm 2.00E-03+	-2.02E+00 \pm 1.41E-01
C03	0.00E+00 \pm 0.00E+00 \approx	0.00E+00 \pm 0.00E+00 \approx	0.00E+00 \pm 0.00E+00 \approx	3.75E-09 \pm 4.81E-04-	0.00E+00 \pm 0.00E+00
C04	-9.92E-06 \pm 1.55E-07-	-9.99E-06 \pm 1.60E-10-	-1.00E-05 \pm 0.00E+00 \approx	-9.97E-06 \pm 4.28E-03 \approx	-1.00E-05 \pm 0.00E+00
C05	-4.84E+02 \pm 3.89E-13 \approx	-4.84E+02 \pm 6.25E-13 \approx	-4.11E+02 \pm 7.63E+01-	-4.80E+02 \pm 6.30E+00-	-4.84E+02 \pm 8.09E-07
C06	-5.79E+02 \pm 3.63E-03-	-5.79E+02 \pm 9.07E-04 \approx	-5.62E+02 \pm 4.51E+01-	-5.80E+02 \pm 7.30E-08+	-5.79E+02 \pm 5.04E-04
C07	0.00E+00 \pm 0.00E+00 \approx	0.00E+00 \pm 0.00E+00 \approx	1.33E-01 \pm 7.28E-01-	1.17E-08 \pm 2.70E+00-	0.00E+00 \pm 0.00E+00
C08	6.73E+00 \pm 5.56E+00 \approx	8.39E+00 \pm 4.49E+00 \approx	6.16E+00 \pm 6.45E+00 \approx	4.09E+00 \pm 1.46E+00+	7.11E+00 \pm 4.79E+00
C09	0.00E+00 \pm 0.00E+00+	2.93E+01 \pm 1.99E+01 \approx	1.47E-01 \pm 8.05E-01+	2.70E+01 \pm 7.50E+01 \approx	2.50E+01 \pm 3.92E+01
C10	0.00E+00 \pm 0.00E+00+	4.80E+01 \pm 3.29E+01 \approx	1.71E+00 \pm 7.66E+00+	1.62E+03 \pm 5.00E+02-	4.17E+01 \pm 8.69E-06
C11	-1.52E-03 \pm 6.34E-11 \approx	-1.52E-03 \pm 6.02E-11 \approx	-4.40E-03 \pm 1.57E-02-*	-9.20E-04 \pm 8.23E-04-	-1.52E-03 \pm 5.63E-14
C12	-3.37E+02 \pm 1.78E+02-	-4.70E+02 \pm 1.42E+02+	-1.72E+02 \pm 2.21E+02-*	-4.36E+02 \pm 6.02E+01 \approx	-3.84E+02 \pm 2.17E+02
C13	-6.84E+01 \pm 1.03E-06 \approx	-6.80E+01 \pm 1.33E+00-	-6.51E+01 \pm 2.38E+00-	-6.79E+01 \pm 3.11E-01-	-6.84E+01 \pm 2.52E-09
C14	0.00E+00 \pm 0.00E+00 \approx	0.00E+00 \pm 0.00E+00 \approx	7.02E+05 \pm 3.19E+06-	1.22E-04 \pm 2.90E-08-	0.00E+00 \pm 0.00E+00
C15	1.80E-01 \pm 8.81E-01+	2.21E+01 \pm 1.05E+02-	2.34E+13 \pm 5.30E+13-	5.19E-09 \pm 1.10E-08+	3.09E+00 \pm 1.37E+00
C16	3.70E-01 \pm 3.71E-01-	2.34E-02 \pm 2.64E-02 \approx	3.93E-02 \pm 4.28E-02-	9.96E-18 \pm 6.27E-15+	1.19E-02 \pm 2.07E-02
C17	1.25E-01 \pm 1.94E-01-	4.15E-02 \pm 1.24E-01 \approx	1.12E-01 \pm 3.32E-01-	2.93E+00 \pm 2.29E+00-	7.83E-02 \pm 2.25E-01
C18	9.68E-19 \pm 1.81E-18-	5.79E-17 \pm 2.24E-16-	0.00E+00 \pm 0.00E+00+	1.66E+00 \pm 1.27E+00-	5.23E-26 \pm 1.71E-25
-	6	4	10	9	
+	4	2	4	5	
\approx	8	12	4	4	

"-", "+", and " \approx " denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. "*" denotes that feasible solutions cannot be consistently found by the corresponding method in all runs.

TABLE S7

EXPERIMENTAL RESULTS OF DyHF [56], CMODE [57], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF DyHF AND CMODE.

Test Function with 10D from IEEE CEC2010	DyHF Mean OFV±Std Dev	CMODE Mean OFV±Std Dev	FROFI Mean OFV±Std Dev
C01	-7.47E-01±1.9E-03≈	-7.47E-01±2.35E-13≈	-7.47E-01±1.35E-03
C02	-9.45E-01±1.15E+00-(84%)*	-1.48E+00±4.88E-01-(96%)*	-2.02E+00±1.41E-01
C03	9.66E+04±4.83E+05-(92%)*	2.84E+00±4.23E+00-	0.00E+00±0.00E+00
C04	-1.00E-05±3.34E-13-	-9.99E-04±2.90E-08-	-1.00E-05±0.00E+00
C05	-2.56E+02±1.53E+02-	-4.50E+02±1.61E+02-(84%)*	-4.84E+02±8.09E-07
C06	-5.66E+02±1.65E+01-	-5.78E+02±1.60E-02-	-5.79E+02±5.04E-04
C07	0.00E+00±0.00E+00≈	6.69E-15±8.95E-15-	0.00E+00±0.00E+00
C08	5.13E+00±5.45E+00+	8.94E+00±3.98E+00≈	7.11E+00±4.79E+00
C09	2.10E+11±6.85E+11-(68%)*	2.13E+06±1.04E+07-(96%)*	2.50E+01±3.92E+01
C10	4.06E+11±1.40E+12-(72%)*	2.13E+06±1.04E+07-(96%)*	4.17E+01±8.69E-06
C11	-8.18E-01±2.20E+00-(0%)*	-7.7E-02±2.85E-02-(12%)*	-1.52E-03±5.63E-14
C12	-4.87E+02±4.38E+02-(20%)*	-6.14E+02±2.74E+02-(60%)*	-3.84E+02±2.17E+02
C13	-6.84E+01±8.10E-06-	-5.79E+01±4.09E+00-	-6.84E+01±2.52E-09
C14	2.10E+01±1.05E+02-	8.18E-09±1.64E-08-	0.00E+00±0.00E+00
C15	2.28E+12±8.94E+12-	1.20E+02±3.48E+02-	3.09E+00±1.37E+00
C16	1.55E-01±2.25E-01-	6.82E-05±1.49E-04+	1.19E-02±2.07E-02
C17	2.40E+01±7.00E+01-(96%)*	4.37E-02±1.12E-01≈	7.83E-02±2.25E-01
C18	5.18E+02±8.84E+02-(96%)*	5.75E+00±2.64E+02-	5.23E-26±1.71E-25
-	15	14	
+	1	1	
≈	2	3	

"-", "+", and "≈" denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. "*" denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S8

EXPERIMENTAL RESULTS OF ϵ DEAG [51], SRS- ϵ DEAG [50], ECHT-DE [72], AIS-IRP [40], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. t -TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF ϵ DEAG, SRS- ϵ DEAG, ECHT-DE, AND AIS-IRP.

Test Function with 30D from IEEE CEC2010	ϵ DEAg Mean OFV \pm Std Dev	SRS- ϵ DEAg Mean OFV \pm Std Dev	ECHT-DE Mean OFV \pm Std Dev	AIS-IRP Mean OFV \pm Std Dev	FROFI Mean OFV \pm Std Dev
C01	-8.21E-01 \pm 7.10E-04 \approx	-8.21E-01 \pm 6.10E-04 \approx	-8.00E-01 \pm 1.79E-02 $-$	-8.20E-01 \pm 3.25E-04 \approx	-8.21E-01 \pm 2.36E-03
C02	-2.15E+00 \pm 1.20E-02 $+$	-2.19E+00 \pm 8.88E-03 $+$	-1.99E+00 \pm 2.10E-01 $-$	-2.21E+00 \pm 2.84E-03 $+$	-2.00E+00 \pm 4.35E-02
C03	2.88E+01 \pm 8.05E-01 $-$	2.87E+01 \pm 2.80E-07 \approx	9.89E+01 \pm 6.26E+01 $-$	6.68E+01 \pm 4.26E+02 $-$	2.87E+01 \pm 6.24E-08
C04	8.16E-03 \pm 3.07E-03 $-$	5.70E-03 \pm 1.84E-03 $-$	-1.03E-06 \pm 9.01E-03 $-$	1.98E-03 \pm 1.61E-03 $-$	-3.33E-06 \pm 4.13E-10
C05	-4.50E+02 \pm 2.90E+00 $-$	-4.63E+02 \pm 3.37E+00 $-$	-1.06E+02 \pm 1.67E+02 $-$	-4.36E+02 \pm 2.51E+01 $-$	-4.81E+02 \pm 2.84E+00
C06	-5.28E+02 \pm 4.75E-01 $-$	-5.29E+02 \pm 2.54E-01 \approx	-1.38E+02 \pm 9.89E+01 $-$	-4.54E+02 \pm 4.79E+01 $-$	-5.29E+02 \pm 5.71E-01
C07	2.60E-15 \pm 1.23E-15 $-$	2.70E-15 \pm 1.61E-15 $-$	1.33E-01 \pm 7.28E-01 $-$	1.07E+00 \pm 1.61E+00 $-$	0.00E+00 \pm 0.00E+00
C08	7.83E-14 \pm 4.86E-14 $-$	4.90E-14 \pm 3.09E-14 $-$	3.36E+01 \pm 1.11E+02 $-$	1.65E+00 \pm 6.41E-01 $-$	0.00E+00 \pm 0.00E+00
C09	1.07E+01 \pm 2.82E+01 $+$	2.43E+00 \pm 1.20E+01 $+$	4.24E+01 \pm 1.38E+02 \approx	1.57E+00 \pm 1.96E+00 $+$	4.30E+01 \pm 3.27E+01
C10	3.33E+01 \pm 4.55E-01 $-$	3.29E+01 \pm 4.74E-01 $-$	5.34E+01 \pm 8.83E+01 \approx	1.78E+01 \pm 1.88E+01 $+$	3.13E+01 \pm 8.22E-02
C11	-2.86E-04 \pm 2.71E-05 $-$	-2.99E-04 \pm 3.32E-05 $-$	2.60E-03 \pm 6.00E-03 $-*$	-1.58E-04 \pm 4.67E-05 $-$	-3.92E-04 \pm 2.64E-06
C12	3.56E+02 \pm 2.89E+02 $-*$	2.13E+02 \pm 2.71E+02 $-*$	-2.51E+01 \pm 1.37E+02 $-*$	4.29E-06 \pm 4.52E-04 $-$	-1.99E-01 \pm 1.42E-06
C13	-6.54E+01 \pm 5.73E-01 $-$	-6.59E+01 \pm 6.18E-01 $-$	-6.46E+01 \pm 1.67E+00 $-$	-6.62E+01 \pm 2.27E-01 $-$	-6.83E+01 \pm 1.95E-01
C14	3.09E-13 \pm 5.61E-13 $-$	1.04E-13 \pm 8.24E-14 $-$	1.24E+05 \pm 6.77E+05 $-$	8.68E-07 \pm 3.14E-07 $-$	9.80E-29 \pm 4.90E-28
C15	2.16E+01 \pm 1.10E-04 \approx	2.16E+01 \pm 6.24E-05 \approx	1.94E+11 \pm 4.35E+11 $-$	3.41E+01 \pm 3.82E+01 $-$	2.16E+01 \pm 8.03E-05
C16	2.17E-21 \pm 1.06E-20 $-$	0.00E+00 \pm 0.00E+00 \approx	0.00E+00 \pm 0.00E+00 \approx	8.21E-02 \pm 1.12E-01 $-$	0.00E+00 \pm 0.00E+00
C17	6.33E+00 \pm 4.99E+00 $-$	1.17E-01 \pm 7.77E-01 \approx	2.75E-01 \pm 3.78E-01 $-$	3.61E+00 \pm 2.54E+00 $-$	1.59E-01 \pm 3.82E-01
C18	8.75E+01 \pm 1.66E+02 $-$	3.95E+01 \pm 6.23E+01 $-$	0.00E+00 \pm 0.00E+00 $+$	4.02E+01 \pm 1.80E+01 $-$	4.87E-01 \pm 1.25E+00
-	14	10	14	14	
+	2	2	1	3	
\approx	2	6	3	1	

" $-$ ", " $+$ ", and " \approx " denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. " $*$ " denotes that feasible solutions cannot be consistently found by the corresponding method in all runs.

TABLE S9

EXPERIMENTAL RESULTS OF DyHF [56], CMODE [57], AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND EACH OF DyHF AND CMODE.

Test Function with 30D from IEEE CEC2010	DyHF	CMODE	FROFI
	Mean OFV±Std Dev	Mean OFV±Std Dev	Mean OFV±Std Dev
C01	-8.21E-01±1.80E-03≈	-8.21E-01±3.3E-03≈	-8.21E-01±2.36E-03
C02	5.74E-01±1.59E+00-(88%)*	9.75E-01±6.25E+01-	-2.00E+00±4.35E-02
C03	3.03E+12±8.18E+12-(0%)*	2.18E+01±1.25E+01≈	2.87E+01±6.24E-08
C04	8.25E+00±7.15E+00-(0%)*	6.72E-04±4.24E-04-	-3.33E-06±4.13E-10
C05	2.95E+12±8.18E+12-(60%)*	2.77E+02±2.03E+02-(0%)*	-4.81E+02±2.84E+00
C06	-2.10E+01±2.91E+02-(88%)*	-4.96E+02±2.15E+02-(0%)*	-5.29E+02±5.71E-01
C07	1.59E-01±7.97E-01-	5.24E-05±5.89E-05-	0.00E+00±0.00E+00
C08	4.72E+00±2.36E+01-	3.68E-01±2.62E-01-	0.00E+00±0.00E+00
C09	1.50E+13±1.57E+13-(60%)*	1.72E+13±1.07E+13-(0%)*	4.30E+01±3.27E+01
C10	1.57E+13±1.38E+13-(44%)*	1.60E+13±7.00E+12-(12%)*	3.13E+01±8.22E-02
C11	-1.68E-01±7.04E-01-(0%)*	9.5E-03±9.7E-03-(48%)*	-3.92E-04±2.64E-06
C12	-1.59E+01±3.87E+02-(0%)*	-3.46E+00±7.35E+02-(84%)*	-1.99E-01±1.42E-06
C13	-6.61E+01±1.91E+00-	-3.89E+01±2.17E+00-	-6.83E+01±1.95E-01
C14	2.41E+12±8.94E+12-	9.31E+00±2.46E+00-	9.80E-29±4.90E-28
C15	5.49E+13±7.61E+13-	1.51E+13±8.26E+12-	2.16E+01±8.03E-05
C16	7.41E-01±1.85E-01-	6.30E-02±2.72E-02-	0.00E+00±0.00E+00
C17	6.04E+02±4.92E+02-(76%)*	3.12E+02±2.75E+02-(80%)*	1.59E-01±3.82E-01
C18	1.18E+04±1.31E+04-(76%)*	7.36E+03±3.12E+03-	4.87E-01±1.25E+00
-	17	16	
+	0	0	
≈	1	2	

"-", "+", and "≈" denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. "*" denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S10

EXPERIMENTAL RESULTS OF FROFI_WoR AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 10D FROM IEEE CEC2010 USING 2×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND FROFI_WoR.

Test Function with 10D from IEEE CEC2010	FROFI_WoR Mean OFV±Std Dev	FROFI Mean OFV±Std Dev
C01	-7.47E-01±1.4E-03≈	-7.47E-01±1.35E-03
C02	2.30E+00±1.49E+00—(88%)*	-2.02E+00±1.41E-01
C03	0.00E+00±0.00E+00≈	0.00E+00±0.00E+00
C04	-1.00E-05±0.00E+00≈	-1.00E-05±0.00E+00
C05	3.31E+02±1.74E+02—(0%)*	-4.84E+02±8.09E-07
C06	2.76E+02±2.04E+02—(0%)*	-5.79E+02±5.04E-04
C07	1.60E-01±7.97E-01≈	0.00E+00±0.00E+00
C08	8.84E+00±4.17E+00—	7.11E+00±4.79E+00
C09	1.04E+13±6.68E+12—(8%)*	2.50E+01±3.92E+01
C10	7.48E+12±5.07E+12—(0%)*	4.17E+01±8.69E-06
C11	-1.52E-03±2.80E-18+	-1.52E-03±5.63E-14
C12	-1.07E+01±5.00E+01—(80%)*	-3.84E+02±2.17E+02
C13	-6.84E+01±2.97E-14+	-6.84E+01±2.52E-09
C14	9.95E+10±9.01E+10—	0.00E+00±0.00E+00
C15	2.76E+13±2.01E+13—	3.09E+00±1.37E+00
C16	1.05E+00±2.51E-02—(56%)*	1.19E-02±2.07E-02
C17	4.83E+02±2.23E+02—(52%)*	7.83E-02±2.25E-01
C18	9.97E+03±4.65E+03—(88%)*	5.23E-26±1.71E-25
—	12	
+	2	
≈	4	

“—”, “+”, and “≈” denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. “*” denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S11

EXPERIMENTAL RESULTS OF FROFI_WoR AND FROFI OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY. WILCOXON'S RANK SUM TEST AT A 0.05 SIGNIFICANCE LEVEL WAS PERFORMED BETWEEN FROFI AND FROFI_WoR.

Test Function with 30D from IEEE CEC2010	FROFI_WoR Mean OFV±Std Dev	FROFI Mean OFV±Std Dev
C01	-8.20E-01±2.1E-03≈	-8.21E-01±2.36E-03
C02	3.22E+00±5.32E-01—	-2.00E+00±4.35E-02
C03	3.26E+11±1.21E+12—	2.87E+01±6.24E-08
C04	-3.31E-06±6.87E-08—	-3.33E-06±4.13E-10
C05	5.06E+02±8.05E+01—(0%)*	-4.81E+02±2.84E+00
C06	5.40E+02±6.19E+01—(0%)*	-5.29E+02±5.71E-01
C07	0.00E+00±0.00E+00≈	0.00E+00±0.00E+00
C08	1.60E-01±7.97E-01—	0.00E+00±0.00E+00
C09	3.40E+13±1.04E+13—(0%)*	4.30E+01±3.27E+01
C10	4.32E+13±1.40E+13—(4%)*	3.13E+01±8.22E-02
C11	-3.92E-04±4.78E-09+	-3.92E-04±2.64E-06
C12	-3.23E+01±1.95E+02—(48%)*	-1.99E-01±1.42E-06
C13	-6.25E+01±1.75E+00—	-6.83E+01±1.95E-01
C14	2.65E+08±1.01E+09—	9.80E-29±4.90E-28
C15	1.63E+14±5.43E+13—	2.16E+01±8.03E-05
C16	1.14E+00±4.01E-02—(44%)*	0.00E+00±0.00E+00
C17	1.61E+03±5.05E+02—(88%)*	1.59E-01±3.82E-01
C18	2.92E+04±6.16E+03—	4.87E-01±1.25E+00
—	15	
+	1	
≈	2	

"—", "+", and "≈" denote that the performance of the corresponding method is worse than, better than, and similar to that of FROFI, respectively. "*" denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.

TABLE S12

EXPERIMENTAL RESULTS OF FROFI_13, FROFI_14, FROFI_15, FROFI_16, AND FROFI_17 OVER 25 INDEPENDENT RUNS ON 18 TEST FUNCTIONS WITH 30D FROM IEEE CEC2010 USING 6×10^5 FES. "MEAN OFV" AND "STD DEV" INDICATE THE AVERAGE AND STANDARD DEVIATION OF THE OBJECTIVE FUNCTION VALUES OBTAINED IN 25 RUNS, RESPECTIVELY.

Test Function with 30D from IEEE CEC2010	FROFI_13 Mean OFV±Std Dev	FROFI_14 Mean OFV±Std Dev	FROFI_15 Mean OFV±Std Dev	FROFI_16 Mean OFV±Std Dev	FROFI_17 Mean OFV±Std Dev
C01	-8.20E-01±2.29E-03	-8.20E-01±2.25E-03	-8.21E-01±2.36E-03	-8.20E-01±2.39E-03	-8.20E-01±1.73E-03
C02	-1.99E+00±4.79E-02	-1.99E+00±4.34E-02	-2.00E+00±4.35E-02	-2.01E+00±3.80E-02	-2.00E+00±4.13E-02
C03	2.87E+01±2.55E-08	2.87E+01±3.99E-08	2.87E+01±6.24E-08	2.75E+01±5.73E+00	2.87E+01±5.74E-08
C04	-3.33E-06±8.53E-11	-3.33E-06±5.35E-10	-3.33E-06±4.13E-10	-3.33E-06±1.88E-10	-3.33E-06±8.2E-11
C05	-4.81E+02±1.70E+00	-4.81E+02±1.10E+00	-4.81E+02±2.84E+00	-4.81E+02±1.33E+00	-4.81E+02±1.58E+00
C06	-5.27E+02±1.20E+00	-5.28E+02±8.70E-01	-5.29E+02±5.71E-01	-5.28E+02±7.85E-01	-5.28E+02±7.60E-01
C07	0.00E+00±0.00E+00	1.59E-01±7.97E-01	0.00E+00±0.00E+00	0.00E+00±0.00E+00	0.00E+00±0.00E+00
C08	3.67E+00±1.84E+01	8.49E+00±2.94E+01	0.00E+00±0.00E+00	0.00E+00±0.00E+00	3.67E+00±1.84E+01
C09	5.68E+01±1.12E+02	5.70E+01±2.84E+01	4.30E+01±3.27E+01	3.67E+01±4.23E+01	4.14E+01±3.80E+01
C10	3.17E+01±1.47E+00	3.14E+01±9.02E-01	3.13E+01±8.22E-02	3.13E+01±2.64E-02	3.13E+01±1.85E-02
C11	-3.92E-04±1.65E-06	-3.92E-04±1.18E-08	-3.92E-04±2.64E-06	-3.92E-04±1.77E-07	-3.92E-04±2.44E-07
C12	1.71E-01±1.33E+00 (84%)*	-1.17E+01±5.88E+01 (88%)*	-1.99E-01±1.42E-06	-7.92E-01±3.35E+00 (92%)*	-5.08E+00±2.52E+01 (92%)*
C13	-6.82E+01±4.86E-01	-6.80E+01±6.59E-01	-6.83E+01±1.95E-01	-6.82E+01±4.01E-01	-6.83E+01±3.73E-01
C14	1.59E-01±7.97E-01	0.00E+00±0.00E+00	9.80E-29±4.90E-28	0.00E+00±0.00E+00	0.00E+00±0.00E+00
C15	2.16E+01±3.53E-05	2.16E+01±5.61E-05	2.16E+01±8.03E-05	2.16E+01±6.87E-05	2.16E+01±1.02E-04
C16	0.00E+00±0.00E+00	6.78E-04±3.39E-03	0.00E+00±0.00E+00	5.10E-03±4.42E-01	2.49E-03±1.24E-02
C17	1.47E-01±2.40E-01	2.99E-01±3.94E-01	1.59E-01±3.82E-01	2.25E-01±4.42E-01	2.19E-01±4.57E-01
C18	1.90E+00±6.08E+00	9.68E-01±2.33E+00	4.87E-01±1.25E+00	6.86E-01±1.73E+00	1.12E+00±3.55E+00

** denotes that feasible solutions cannot be consistently found by the corresponding method in all runs, and (#) denotes the feasible rate.