Supplementary materials

Table S1. CEC2013 test suite.

Type	No.	Functions	Search Range	F_{min}
Unimodal functions	1	Sphere Function	[-100,100]	-1400
	2	Rotated High Conditioned Elliptic Function	[-100,100]	-1300
	3	Rotated Bent Cigar Function	[-100,100]	-1200
	4	Rotated Discus Function	[-100,100]	-1100
	5	Different Powers Function	[-100,100]	-1000
Basic multimodal functions	6	Rotated Rosenbrock's Function	[-100,100]	-900
	7	Rotated Schaffers F7 Function	[-100,100]	-800
	8	Rotated Ackley's Function	[-100,100]	-700
	9	Rotated Weierstrass Function	[-100,100]	-600
	10	Rotated Griewank's Function	[-100,100]	-500
	11	Rastrigon's Function	[-100,100]	-400
	12	Rotated Rastrigin's Function	[-100,100]	-300
	13	Non-Continuous Rotated Rastrigin's Function	[-100,100]	-200
	14	Schwefel's Function	[-100,100]	-100
	15	Rotated Schwefel's Function	[-100,100]	100
	16	Rotated Katsuura Function	[-100,100]	200
	17	Lunacek Bi Rastrigin Function	[-100,100]	300
	18	Rotated Lunacek Bi rastrigin Function	[-100,100]	400
	19	Expanded Griewank's plus Rosenbrock's Function	[-100,100]	500
	20	Expanded Scaffer's F6 Function	[-100,100]	600
Composition functions	21	Composition Functi7on 1 (n = 5, Rotated)	[-100,100]	700
	22	Composition Function 2 (n = 3, Unrotated)	[-100,100]	800
	23	Composition Function 3 (n = 3, Rotated)	[-100,100]	900
	24	Composition Function 4 (n = 3, Rotated)	[-100,100]	1000
	25	Composition Function 5 (n = 3, Rotated)	[-100,100]	1100
	26	Composition Function 6 (n = 5, Rotated)	[-100,100]	1200
	27	Composition Function 7 (n = 5, Rotated)	[-100,100]	1300
	28	Composition Function 8 (n = 5, Rotated)	[-100,100]	1400

Table S2. CEC2017 test suite.

	No.	Functions	Search Range	F_{min}
Unimodal functions	1	Shifted and Rotated Bent Cigar Function	[-100,100]	100
	3	Shifted and Rotated Zakharov Function	[-100,100]	300
Multimodal functions	4	Shifted and Rotated Rosenbrock's Function	[-100,100]	400
	5	Shifted and Rotated Rastrigin's Function	[-100,100]	500
	6	Shifted and Rotated Expanded Scaffer's F6 Function	[-100,100]	600
	7	Shifted and Rotated Lunacek Bi-Rastrigin Function	[-100,100]	700
	8	Shifted and Rotated Non-Continuous Rastrigin's Function	[-100,100]	800
	9	Shifted and Rotated Levy Function	[-100,100]	900
	10	Shifted and Rotated Schwefel's Function	[-100,100]	1000
Hybrid functions	11	Hybrid Function 1 ($N = 3$)	[-100,100]	1100
	12	Hybrid Function 2 ($N = 3$)	[-100,100]	1200
	13	Hybrid Function 3 ($N = 3$)	[-100,100]	1300
	14	Hybrid Function 4 ($N = 4$)	[-100,100]	1400
	15	Hybrid Function 5 ($N = 4$)	[-100,100]	1500
	16	Hybrid Function 6 ($N = 4$)	[-100,100]	1600
	17	Hybrid Function 6 ($N = 5$)	[-100,100]	1700
	18	Hybrid Function 6 ($N = 5$)	[-100,100]	1800
	19	Hybrid Function 6 ($N = 5$)	[-100,100]	1900
	20	Hybrid Function 6 ($N = 6$)	[-100,100]	2000
Composition functions	21	Composition Function 1 ($N = 3$)	[-100,100]	2100
	22	Composition Function 2 ($N = 3$)	[-100,100]	2200
	23	Composition Function 3 ($N = 4$)	[-100,100]	2300
	24	Composition Function 4 ($N = 4$)	[-100,100]	2400
	25	Composition Function 5 ($N = 5$)	[-100,100]	2500
	26	Composition Function 6 ($N = 5$)	[-100,100]	2600
	27	Composition Function 7 ($N = 6$)	[-100,100]	2700
	28	Composition Function 8 ($N = 6$)	[-100,100]	2800
	29	Composition Function 9 ($N = 3$)	[-100,100]	2900
	30	Composition Function 10 ($N = 3$)	[-100,100]	3000