

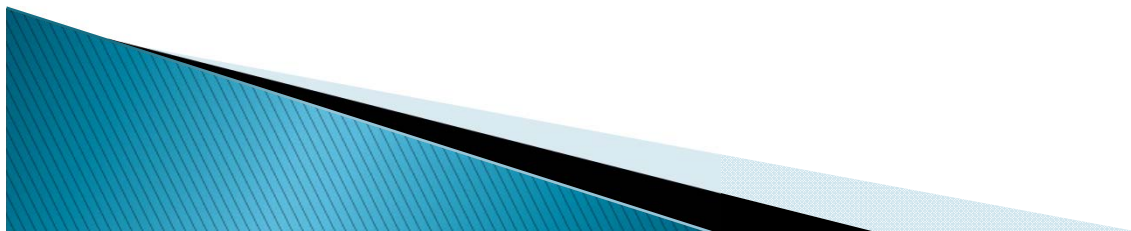
CEC 2015 Special Session on Real-Parameter Single Objective Optimization (Multi-Niche Optimizaiton)

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Introduction

- ▶ CEC'15 Multi-Niche test suite including 15 benchmark functions
<http://www3.ntu.edu.sg/home/epnsugan/>
- ▶ There 8 expanded scalable functions and 7 composition functions. The competition is based on the results of 8 expanded scalable functions (each function has three different dimensions)



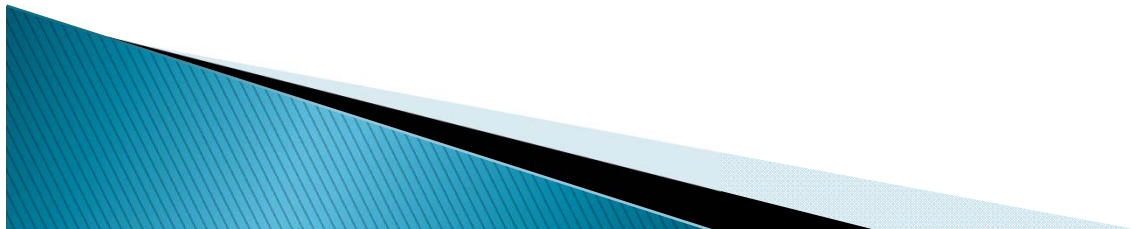
	No.	Functions	Dimension	Goal optima No. global/local*	$F_i^*=F_i(x^*)$
Expanded Scalable Function	1	Shifted and Rotated Expanded Two-Peak Trap	5	1/15	100
			10	1/55	
			20	1/210	
	2	Shifted and Rotated Expanded Five-Uneven-Peak Trap	2	4/21	200
			5	32/0	
			8	256/0	
	3	Shifted and Rotated Expanded Equal Minima	2	25/0	300
			3	125/0	
			4	625/0	
	4	Shifted and Rotated Expanded Decreasing Minima	5	1/15	400
			10	1/55	
			20	1/210	
	5	Shifted and Rotated Expanded Uneven Minima	2	25/0	500
			3	125/0	
			4	625/0	
	6	Shifted and Rotated Expanded Himmelblau's Function	4	16/0	600
			6	64/0	
			8	256/0	
	7	Shifted and Rotated Expanded Six-Hump Camel Back	6	8/0	700
			10	32/0	
			16	256/0	
	8	Shifted and Rotated Modified Vincent Function	2	36/0	800
			3	216/0	
			4	1296/0	
Composition Function	9	Composition Function 1	10, 20, 30	5	900
	10	Composition Function 2	10, 20, 30	5	1000
	11	Composition Function 3	10, 20, 30	5	1100
	12	Composition Function 4	10, 20, 30	5	1200
	13	Composition Function 5	10, 20, 30	5	1300
	14	Composition Function 6	10, 20, 30	5	1400
	15	Composition Function 7	10, 20, 30	5	1500

Search Range: $[-100,100]^D$

level of accuracy = 0.1

Error values smaller than 10^{-8} will be taken as zero.

- ▶ Evaluation criteria:
 - Average number of optima found is used as the assessment criterion using the given level of accuracy. A level of accuracy is a value indicating how close the computed solutions to the known global peaks are. If the difference from a computed solution to a known global optimum is below, then the peak is considered to have been found.
- ▶ 3 papers are accepted in this competition. ANOF performs the best out of 3 algorithms.



Results

		ANOF		PSO (ring structure)		NSDE	
		Average no. of optima	Rank	Average no. of optima	Rank	Average no. of optima	Rank
F1	5D	14.45098	1	0.7058	3	1.60	2
	10D	4.176471	1	0.11764	2	0	3
	20D	0.666666	1	0	2.5	0	2.5
F2	2D	8.647059	1	3.9803	2	3.64	3
	5D	27.01960	1	13.6470	2	4	3
	8D	50.21568	1	15.8823	3	16.2	2
F3	2D	24.84313	1	16.705	3	23.12	2
	3D	45.64705	1	39.3529	2	34.92	3
	4D	68.17647	2	119.7254	1	31.2	3
F4	5D	1.823529	1	0.3333	3	0.40	2
	10D	0.215686	1	0	2.5	0	2.5
	20D	0	2	0	2	0	2
F5	2D	24.90196	1	16.2745	3	22.72	2
	3D	47.43137	1	39.0784	2	0	3
	4D	48.07843	2	118.3529	1	0	3
F6	4D	15.980392	1	8.9803	3	9.28	2
	6D	49.333333	1	18.9215	2	13.84	3
	8D	84.666666	1	38.7843	2	16.60	3
F7	6D	6.333333	1	5.7450	2	2.40	3
	10D	3.666666	2	6.6274	1	0.16	3
	16D	1.058823	2	6.4117	1	0	3
F8	2D	29.05882	1	10.5686	3	18.8	2
	3D	51.117647	1	29.2352	3	49.32	2
	4D	50.725490	2	86.6666	1	31	3
Total rank			41		50		62

