

I A comparison between a genetic algorithm(with two niching methods) and PSO

Prerequisites: Each algorithm has been run for 30 times, and the tables below contain the median fitness for the runs.

Technical details for each technique:

1.Genetic algorithm, with two niching methods:

- Deterministic crowding (200 iterations)
- Restricted tournament selection(5000 iterations),with:
 - mutation_prob = 0.8
 - crossover_prob = 0.6
 - window = 20

For both methods the population size is 80.

*despite there is a big difference in the number of iterations, the overall time is comparable(RTS is faster, but converges slower)

2. PSO

Population size: 250

Innertia: 0.5

Cognitive: 1.2

Social: 1.2

Results:

		Det.Crowding	RTS	PSO
Function	Dimension	Result	Result	Result
Rosenbrock	5	0.072655	0.208480	0.262055
Rosenbrock	10	0.81921	1.262119	3.12500
Rosenbrock	30	15.1955	32.86281	18.79682
Rastrigin	5	0.035785	0.171527	1.62510
Rastrigin	10	0.415371	0.853193	6.10241
Rastrigin	30	6.01127	9.202818	18.64428
Griewangk	5	-0.08537	-0.068742	-0.657305
Griewangk	10	0.027179	0.071379	-0.5959675
Griewangk	30	1.737964	4.858862	-0.0559313
SHCB	2	-1.03162	-1.031623	-1.031353

II Results of a Genetic algorithm solving Cover Set problem

Technical details:

The algorithm combines a niching technique(Deterministic crowding) with the pareto front: we want to optimize two fitness functions:

1. Number of subsets of a candidate solution(lower than K-max)
2. Size of difference between set's union and the entire set of values

Results:

The algorithm ran over 100 iterations:

Set-size(U)	Number of subsets(S)	K-max	Result-number of subsets-	Result - difference
300	30	10	2	0
300	50	10	4	0
300	70	10	5	0
300	100	10	9	0