A Distributed Architecture for Privacy-Preserving Optimization Using Genetic Algorithms and Multi-Party Computation

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Appendix

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Table of Contents

1 Datasets

Table 1 shows the characteristics of the synthetic datasets that we refer to as Cases 1–27.

Table 1. Characteristics of the scenarios used in experiments as Cases 1–27

Case	Concentration	Priorities	Margins	Flights
1	Even	Middle	Broad	100
2	Extreme	Middle	Broad	100
3	Moderate	Middle	Broad	100
4	Even	Fringes	Broad	100
5	Extreme	Fringes	Broad	100
6	Moderate	Fringes	Broad	100
7	Even	Even	Broad	100
8	Extreme	Even	Broad	100
9	Moderate	Even	Broad	100
10	Even	Middle	Normal	100
11	Extreme	Middle	Normal	100
12	Moderate	Middle	Normal	100
13	Even	Fringes	Normal	100
14	Extreme	Fringes	Normal	100
15	Moderate	Fringes	Normal	100
16	Even	Even	Normal	100
17	Extreme	Even	Normal	100
18	Moderate	Even	Normal	100
19	Even	Middle	Narrow	100
20	Extreme	Middle	Narrow	100
21	Moderate	Middle	Narrow	100
22	Even	Fringes	Narrow	100
23	Extreme	Fringes	Narrow	100
24	Moderate	Fringes	Narrow	100
25	Even	Even	Narrow	100
26	Extreme	Even	Narrow	100
27	Moderate	Even	Narrow	100

Figure 1 illustrates the differences between the different concentrations by showing the number of flights wishing a certain slot on the timeline.

Table 2 shows the characteristics of the synthetic datasets that we refer to as Cases 28–47.

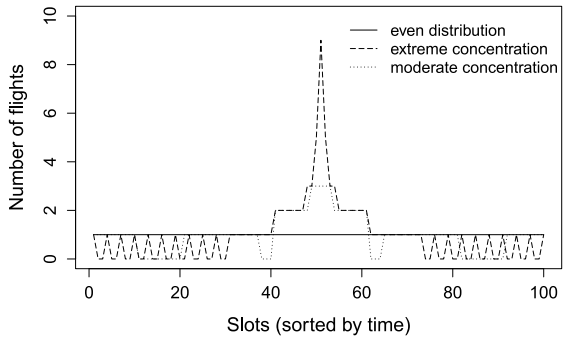

Fig. 1. Different scenarios of concentration of the flights' wished times

Table 2. Distribution of margin widths (a, b) and concentration of wished times (c) for the random generation of synthetic datasets for Cases 28–47 in our experiments. Concerning the distribution of margin widths, the absolute (f) and relative (p) probabilities are indicated per bin of margin widths delimited by a *min* and *max* width. Concerning the concentration of wished times, the absolute (f) and relative (p) probabilities that a time is wished by n flights are indicated.

min	max	f	p
0	10	8	0.0304
11	20	25	0.0951
21	30	30	0.1141
31	40	22	0.0837
41	50	23	0.0875
51	60	20	0.0760
61	70	19	0.0722
71	80	6	0.0228
81	90	9	0.0342
91	100	5	0.0190
101	110	6	0.0228
111	120	1	0.0038
121	130	2	0.0076
131	140	2	0.0076
141	150	6	0.0228
161	170	4	0.0152
171	180	1	0.0038
181	190	3	0.0114

(a)

min	max	f	p
191	200	1	0.0038
201	210	4	0.0152
241	250	1	0.0038
251	260	2	0.0076
261	270	3	0.0114
321	330	5	0.0190
331	340	2	0.0076
371	380	2	0.0076
381	390	3	0.0114
391	400	2	0.0076
441	450	3	0.0114
461	470	1	0.0038
471	480	1	0.0038
501	510	3	0.0114
551	560	3	0.0114
611	620	3	0.0114
671	680	3	0.0114
701	1420	29	0.1103

(b)

n	f	p
1	131	0.736
2	23	0.129
3	14	0.079
4	7	0.039
5	2	0.011
6	1	0.006

(c)

2 Experimental Results

This section presents the analysis of the results from different experimental runs that have been executed as part of this paper. Tables show the relative fitness achieved by different configurations with regards to the optimum for our test cases, the generations in which certain thresholds have been surpassed, and the average durations of the optimizations. The measured duration is from the time the optimization starts to the time the optimization ends, including running the Hungarian algorithm and other tasks for collecting statistical data for the experiments. We did not optimize for run time performance. The durations should therefore not be interpreted in isolation but only hint at the actual run time. Furthermore, run times will likely depend on many things. A more accurate measurement of the duration or complexity of the optimization run is the number of generations needed to achieve a certain fitness. Figures will show the evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of selected cases of the optimizations.

We refer to the following website for the sources and documentation:
https://jku-win-dke.github.io/SlotMachine-Optimizer/

The datasets and full experimental results are also available for download:

- http://final.at/coopis2022/run1.zip
- http://final.at/coopis2022/run2.zip
- http://final.at/coopis2022/run3.zip
- http://final.at/coopis2022/run4.zip

2.1 Methods

This section explains the identifiers we use to refer to the different obfuscation methods and configurations employed in our experiments. The identifiers on top of the following tables refer to the fitness methods that have been laid out in the paper, the fitness estimator that has been used, and the chosen parameter. Details for the different options are given in the main paper.

ORDER refers to the fitness method *order*. A fitness estimator has to be chosen for this method; e.g., *ORDER_LIN* indicates that these optimizations have been configured to use the fitness method *order* in conjunction with a linear fitness estimator. Likewise, the prefixes *OQ_LIN* and *FR_LIN* identify the fitness methods *order quantiles* and *fitness range*, respectively. For these methods, the number of buckets is specified by the identifier; e.g., *OQ_LIN_10* identifies a configuration composed of the *order quantiles* method along with a linear fitness estimator, where the individuals of each population are assigned to 10 quantiles. The fitness methods *top individuals* and *above threshold*, identified by *ABOVE* and *TOP* respectively, do not require a fitness estimator. *ABOVE_70* would refer to a configuration that uses a threshold of 70%; in this case, all individuals whose fitness surpasses 70% of the best solutions' fitness in a given population,

are known to the GA. *TOP_30* on the other hand uses the fitness method *top individuals*, with the top 30% of the population being disclosed to the GA.

The following sections provides details regarding the experimental runs, the analysis of the collected experimental data, and the configurations.

2.2 Run 1

The first experimental run consisted of the cases 1-27[4]. The GA has been configured to terminate when either 500 generations have been evaluated, or the optimum fitness (as determined by the *Hungarian* algorithm at the beginning of each optimization) has been reached. Deduplication has been activated with the maximum retries[5] set to 10. The fitness of the best solution in each generation has been disclosed to the GA, to determine if it represents an improvement to the current best solution and to estimate fitness values for each individual.

[4] A description of the test cases can be found in the paper.

[5] Determines how often the GA attempts to remove duplicates from a generation before it accepts duplicates for said generation.

Table 3. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_70						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.53%	*97.51%*	*97.54%*	97.42%	*97.37%*	*97.47%*
3	99.30%	*99.29%*	*99.31%*	99.30%	*99.29%*	*99.32%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.59%	*94.52%*	*94.64%*	94.27%	*94.22%*	*94.33%*
6	96.19%	*96.09%*	*96.25%*	96.25%	*96.13%*	*96.40%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.63%	*94.55%*	*94.70%*	94.54%	*94.52%*	*94.60%*
9	97.45%	*97.41%*	*97.48%*	97.39%	*97.37%*	*97.42%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	70.23%	*69.90%*	*70.48%*	69.78%	*69.29%*	*69.99%*
12	99.11%	*99.11%*	*99.11%*	99.10%	*99.10%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	66.80%	*65.51%*	*67.34%*	62.20%	*58.76%*	*64.49%*
15	96.91%	*96.90%*	*96.91%*	96.90%	*96.88%*	*96.95%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	62.46%	*60.54%*	*65.40%*	60.60%	*59.60%*	*61.68%*
18	96.26%	*96.23%*	*96.30%*	96.21%	*96.19%*	*96.26%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	55.14%	*52.25%*	*60.53%*	47.06%	*44.48%*	*49.40%*
21	55.49%	*53.19%*	*56.82%*	45.75%	*43.18%*	*48.89%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	62.11%	*59.98%*	*64.81%*	57.48%	*53.89%*	*64.00%*
24	57.09%	*54.37%*	*62.24%*	49.99%	*47.98%*	*52.14%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	61.76%	*59.00%*	*63.96%*	53.94%	*52.28%*	*56.55%*
27	55.41%	*54.91%*	*55.78%*	47.96%	*45.29%*	*49.55%*

Table 4. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_70													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	-	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	-	-	-	-	-	-	-	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 5. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_70		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	2.93	0.18
2	49.36	8.95
3	49.23	8.86
4	2.98	0.19
5	49.32	8.94
6	49.65	8.94
7	2.95	0.19
8	49.63	8.99
9	49.29	8.96
10	2.99	0.19
11	50.42	9.09
12	51.09	9.17
13	3.12	0.20
14	54.92	9.33
15	51.66	9.05
16	2.99	0.19
17	49.66	8.92
18	48.75	8.79
19	2.99	0.19
20	47.09	9.00
21	54.78	8.93
22	3.00	0.19
23	47.02	9.00
24	59.59	9.15
25	2.96	0.19
26	46.75	8.94
27	57.25	9.02

Table 6. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_80						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.52%	*97.51%*	*97.56%*	97.40%	*97.37%*	*97.43%*
3	99.30%	*99.30%*	*99.30%*	99.29%	*99.29%*	*99.29%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.64%	*94.52%*	*94.77%*	94.25%	*94.20%*	*94.33%*
6	96.24%	*96.20%*	*96.29%*	96.12%	*96.08%*	*96.22%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.71%	*94.64%*	*94.86%*	94.60%	*94.52%*	*94.84%*
9	97.45%	*97.39%*	*97.50%*	97.39%	*97.37%*	*97.45%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	75.74%	*73.95%*	*76.51%*	70.14%	*69.95%*	*70.34%*
12	99.11%	*99.11%*	*99.12%*	99.10%	*99.10%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	77.51%	*75.56%*	*79.58%*	73.24%	*70.30%*	*75.50%*
15	96.91%	*96.90%*	*96.93%*	96.87%	*96.86%*	*96.89%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	72.02%	*70.28%*	*75.57%*	69.68%	*67.45%*	*71.67%*
18	96.27%	*96.24%*	*96.32%*	96.24%	*96.20%*	*96.30%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	64.36%	*62.79%*	*66.30%*	50.86%	*46.45%*	*58.91%*
21	65.38%	*63.56%*	*66.85%*	54.60%	*51.84%*	*62.01%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	70.32%	*68.50%*	*72.50%*	67.28%	*65.77%*	*70.11%*
24	71.36%	*68.47%*	*73.13%*	61.19%	*55.99%*	*64.03%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	70.67%	*67.41%*	*73.34%*	60.78%	*57.04%*	*63.83%*
27	68.69%	*65.72%*	*76.07%*	59.71%	*55.34%*	*63.00%*

Table 7. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_80													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	398	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	87	-	-	-	-	-	312	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	325	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	2	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	458	-	-	-	-	-	-	-	-	-	-	-	

Table 8. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_80		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	2.99	0.19
2	48.77	9.14
3	51.12	8.99
4	2.99	0.19
5	50.35	8.89
6	49.54	8.87
7	2.99	0.19
8	51.38	8.95
9	49.62	9.20
10	3.09	0.20
11	51.71	9.12
12	50.98	9.06
13	3.18	0.20
14	55.31	9.23
15	51.55	8.79
16	3.01	0.19
17	52.29	8.95
18	50.44	8.78
19	3.00	0.19
20	47.09	8.99
21	64.66	9.12
22	2.95	0.20
23	47.62	9.05
24	62.07	9.33
25	2.96	0.19
26	47.35	8.99
27	64.15	9.26

Table 9. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_90						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.57%	*97.54%*	*97.62%*	97.45%	*97.37%*	*97.54%*
3	99.32%	*99.30%*	*99.34%*	99.30%	*99.29%*	*99.30%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.62%	*94.52%*	*94.67%*	94.26%	*94.22%*	*94.32%*
6	96.30%	*96.25%*	*96.36%*	96.19%	*96.09%*	*96.27%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.80%	*94.69%*	*94.90%*	94.68%	*94.49%*	*94.90%*
9	97.54%	*97.47%*	*97.69%*	97.49%	*97.42%*	*97.61%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	86.65%	*84.73%*	*88.22%*	77.58%	*74.21%*	*81.51%*
12	99.12%	*99.12%*	*99.13%*	99.11%	*99.11%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	85.47%	*83.40%*	*88.35%*	82.65%	*81.22%*	*83.96%*
15	96.94%	*96.90%*	*97.00%*	96.88%	*96.86%*	*96.90%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	85.16%	*84.55%*	*86.26%*	80.06%	*77.91%*	*82.39%*
18	96.32%	*96.26%*	*96.37%*	96.25%	*96.20%*	*96.34%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	75.47%	*71.53%*	*78.09%*	59.03%	*58.37%*	*60.18%*
21	78.85%	*76.96%*	*81.14%*	64.71%	*62.66%*	*67.07%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	76.81%	*74.95%*	*78.49%*	75.57%	*73.68%*	*78.01%*
24	84.00%	*82.88%*	*85.11%*	76.53%	*73.86%*	*79.31%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	78.23%	*76.29%*	*81.48%*	69.94%	*64.49%*	*73.91%*
27	81.33%	*78.19%*	*84.57%*	69.42%	*67.10%*	*71.08%*

Table 10. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_90												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	-	-	1	1	1	1	-	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	-	-	1	1	1	1	-	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	74	132	276	-	-	-	189	259	-	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	19	38	132	-	-	-	56	199	-	-	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	62	127	354	-	-	-	235	304	-	-	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	386	-	-	-	-	-	-	-	-	-	-	-
21	282	445	-	-	-	-	-	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	178	-	-	-	-	-	337	-	-	-	-	-
24	110	185	485	-	-	-	365	-	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	280	319	-	-	-	-	-	-	-	-	-	-
27	202	350	-	-	-	-	-	-	-	-	-	-

Table 11. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_90		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	3.11	0.19
2	52.17	8.86
3	49.82	8.75
4	3.09	0.19
5	57.46	8.98
6	55.29	9.12
7	3.27	0.20
8	56.77	9.37
9	54.32	9.36
10	3.23	0.20
11	58.83	9.39
12	51.51	8.73
13	3.02	0.19
14	55.73	9.13
15	64.51	9.02
16	3.00	0.19
17	60.13	9.26
18	55.88	8.92
19	3.15	0.20
20	49.86	9.23
21	75.61	9.72
22	3.03	0.19
23	47.96	9.59
24	63.90	9.69
25	3.13	0.19
26	46.48	9.13
27	67.30	9.47

Table 12. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_95						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.68%	*97.63%*	*97.74%*	97.50%	*97.41%*	*97.60%*
3	99.33%	*99.32%*	*99.34%*	99.31%	*99.29%*	*99.33%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.74%	*94.64%*	*94.82%*	94.35%	*94.28%*	*94.48%*
6	96.39%	*96.27%*	*96.51%*	96.25%	*96.21%*	*96.39%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.87%	*94.76%*	*94.96%*	94.67%	*94.53%*	*94.78%*
9	97.57%	*97.51%*	*97.64%*	97.47%	*97.42%*	*97.56%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	88.79%	*85.11%*	*92.30%*	81.71%	*77.54%*	*83.18%*
12	99.15%	*99.13%*	*99.18%*	99.12%	*99.11%*	*99.13%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	88.43%	*87.87%*	*89.31%*	85.40%	*83.37%*	*86.56%*
15	96.99%	*96.91%*	*97.08%*	96.92%	*96.88%*	*96.98%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	89.20%	*87.71%*	*90.81%*	82.12%	*79.44%*	*85.19%*
18	96.42%	*96.34%*	*96.51%*	96.29%	*96.22%*	*96.34%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	79.16%	*76.79%*	*82.44%*	69.04%	*65.48%*	*74.22%*
21	83.38%	*80.77%*	*86.07%*	70.30%	*68.46%*	*73.08%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	83.18%	*81.40%*	*84.43%*	78.48%	*76.15%*	*80.80%*
24	89.38%	*88.19%*	*90.13%*	81.21%	*77.54%*	*85.42%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	83.87%	*81.41%*	*86.51%*	73.07%	*71.53%*	*75.10%*
27	87.63%	*84.55%*	*90.66%*	71.22%	*64.17%*	*75.49%*

Table 13. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_95													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	-	-	1	1	1	1	-	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	-	-	1	1	1	1	-	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	64	136	226	399	-	-	101	325	-	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	13	18	83	-	-	-	32	69	224	-	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	34	78	206	364	-	-	137	348	485	-	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	345	423	-	-	-	-	-	-	-	-	-	-
21	174	356	435	-	-	-	-	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	96	227	-	-	-	-	219	458	-	-	-	-
24	90	162	263	386	-	-	325	396	492	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	131	217	423	-	-	-	498	-	-	-	-	-
27	128	229	377	396	-	-	492	-	-	-	-	-

Table 14. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_95		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	3.03	0.18
2	56.40	8.98
3	53.43	9.01
4	3.22	0.20
5	62.28	9.21
6	63.54	9.04
7	3.00	0.19
8	60.72	9.32
9	58.65	9.27
10	3.15	0.19
11	71.45	9.48
12	55.86	8.91
13	3.02	0.18
14	51.87	9.16
15	77.10	9.30
16	2.98	0.19
17	56.01	9.22
18	63.37	9.20
19	3.01	0.19
20	49.03	9.45
21	51.21	9.18
22	2.98	0.19
23	47.49	9.18
24	51.25	9.28
25	2.97	0.18
26	47.00	9.31
27	51.26	9.37

Table 15. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_5						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.52%	*97.51%*	*97.54%*	97.41%	*97.40%*	*97.44%*
3	99.30%	*99.29%*	*99.30%*	99.29%	*99.29%*	*99.30%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.60%	*94.51%*	*94.70%*	94.36%	*94.28%*	*94.54%*
6	96.18%	*96.14%*	*96.21%*	96.13%	*96.09%*	*96.20%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.65%	*94.62%*	*94.68%*	94.59%	*94.49%*	*94.69%*
9	97.44%	*97.38%*	*97.49%*	97.39%	*97.37%*	*97.44%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	71.07%	*70.74%*	*71.62%*	70.16%	*69.95%*	*70.36%*
12	99.12%	*99.11%*	*99.17%*	99.11%	*99.10%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	65.30%	*64.26%*	*68.35%*	62.29%	*59.39%*	*66.49%*
15	96.93%	*96.90%*	*96.97%*	96.89%	*96.86%*	*96.95%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	61.92%	*60.42%*	*62.59%*	60.01%	*59.33%*	*60.61%*
18	96.26%	*96.23%*	*96.33%*	96.21%	*96.20%*	*96.22%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	21.62%	*14.59%*	*26.28%*	9.93%	*3.43%*	*17.16%*
21	39.68%	*39.35%*	*40.00%*	37.42%	*37.29%*	*37.92%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	42.41%	*38.29%*	*48.38%*	27.44%	*23.67%*	*33.39%*
24	35.45%	*32.59%*	*41.50%*	33.31%	*30.31%*	*37.62%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	28.08%	*23.69%*	*30.28%*	20.47%	*14.37%*	*24.47%*
27	34.38%	*32.43%*	*35.60%*	32.74%	*30.90%*	*34.76%*

Table 16. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_5													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	-	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	-	-	-	-	-	-	-	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 17. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_5		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.47	0.09
2	59.01	11.70
3	58.76	11.64
4	0.47	0.09
5	59.89	11.67
6	59.46	11.87
7	0.48	0.10
8	62.19	11.77
9	59.26	11.69
10	0.46	0.09
11	58.78	12.11
12	61.12	11.93
13	0.49	0.10
14	62.76	12.31
15	62.67	12.11
16	0.47	0.09
17	59.59	11.95
18	60.16	11.71
19	0.49	0.10
20	62.40	12.11
21	58.86	11.69
22	0.47	0.09
23	60.42	12.35
24	62.46	12.33
25	0.49	0.10
26	62.79	11.84
27	59.25	11.67

Table 18. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_7						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.57%	*97.55%*	*97.63%*	97.46%	*97.40%*	*97.55%*
3	99.31%	*99.29%*	*99.33%*	99.30%	*99.29%*	*99.31%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.62%	*94.53%*	*94.65%*	94.37%	*94.28%*	*94.45%*
6	96.20%	*96.18%*	*96.23%*	96.17%	*96.09%*	*96.26%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.69%	*94.63%*	*94.75%*	94.60%	*94.52%*	*94.64%*
9	97.48%	*97.41%*	*97.56%*	97.42%	*97.37%*	*97.51%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	73.70%	*71.98%*	*75.97%*	70.75%	*69.95%*	*71.76%*
12	99.12%	*99.11%*	*99.13%*	99.11%	*99.10%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	76.57%	*75.01%*	*78.74%*	72.90%	*70.22%*	*75.95%*
15	96.91%	*96.89%*	*96.93%*	96.90%	*96.88%*	*96.96%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	68.79%	*66.49%*	*70.89%*	66.56%	*63.26%*	*69.51%*
18	96.27%	*96.24%*	*96.30%*	96.21%	*96.19%*	*96.24%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	35.81%	*32.37%*	*37.43%*	22.01%	*17.73%*	*30.66%*
21	43.64%	*41.56%*	*44.99%*	39.08%	*37.29%*	*40.50%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	56.48%	*54.07%*	*58.99%*	50.23%	*43.80%*	*57.70%*
24	53.76%	*50.35%*	*58.81%*	43.33%	*41.13%*	*47.04%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	46.94%	*41.87%*	*49.52%*	38.50%	*36.89%*	*42.80%*
27	48.73%	*46.85%*	*50.31%*	40.97%	*38.91%*	*43.07%*

Table 19. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_7													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	367	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	110	-	-	-	-	-	234	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 20. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_7		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.47	0.09
2	58.82	11.58
3	58.84	11.56
4	0.46	0.09
5	59.04	11.64
6	60.31	12.23
7	0.49	0.10
8	61.11	12.02
9	61.98	11.72
10	0.47	0.09
11	58.60	11.61
12	58.55	11.59
13	0.47	0.09
14	60.19	11.85
15	59.15	11.63
16	0.49	0.10
17	62.28	12.07
18	58.45	11.60
19	0.47	0.09
20	59.30	11.71
21	59.51	12.12
22	0.49	0.10
23	63.69	12.49
24	63.03	12.35
25	0.49	0.10
26	63.52	12.35
27	62.28	12.27

Table 21. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.59%	*97.54%*	*97.64%*	97.49%	*97.45%*	*97.54%*
3	99.31%	*99.30%*	*99.33%*	99.30%	*99.29%*	*99.31%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.72%	*94.70%*	*94.75%*	94.35%	*94.28%*	*94.61%*
6	96.33%	*96.26%*	*96.38%*	96.32%	*96.23%*	*96.40%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.77%	*94.67%*	*94.91%*	94.66%	*94.60%*	*94.76%*
9	97.48%	*97.43%*	*97.53%*	97.46%	*97.37%*	*97.55%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	78.83%	*75.88%*	*80.44%*	72.28%	*70.45%*	*75.27%*
12	99.14%	*99.11%*	*99.18%*	99.11%	*99.11%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	82.90%	*80.78%*	*84.61%*	79.35%	*77.83%*	*80.87%*
15	96.94%	*96.89%*	*97.00%*	96.89%	*96.88%*	*96.90%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	80.23%	*78.14%*	*82.56%*	74.81%	*71.02%*	*77.13%*
18	96.32%	*96.26%*	*96.39%*	96.23%	*96.19%*	*96.26%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	48.98%	*42.67%*	*55.33%*	37.09%	*35.04%*	*41.62%*
21	58.31%	*56.48%*	*60.71%*	46.24%	*43.85%*	*49.91%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	66.55%	*63.98%*	*69.56%*	61.26%	*56.42%*	*64.47%*
24	74.39%	*70.46%*	*79.61%*	61.24%	*57.44%*	*64.50%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	61.70%	*60.34%*	*63.23%*	49.57%	*47.81%*	*52.14%*
27	67.00%	*63.15%*	*70.01%*	56.48%	*53.46%*	*62.49%*

Table 22. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_10													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	-	-	1	1	1	1	-	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	-	-	1	1	1	1	-	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	123	400	-	-	-	-	280	-	-	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	33	48	-	-	-	-	88	286	-	-	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	152	320	-	-	-	-	338	-	-	-	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	-	-	-	-	-	-	-	-	-	-	-	-
24	263	-	-	-	-	-	-	-	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-

Table 23. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_10		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.47	0.10
2	59.07	11.73
3	60.25	11.78
4	0.48	0.10
5	60.90	12.15
6	61.16	12.05
7	0.49	0.10
8	59.88	11.60
9	59.08	11.61
10	0.48	0.09
11	60.19	11.74
12	58.05	11.77
13	0.46	0.09
14	59.94	12.00
15	58.96	11.67
16	0.47	0.09
17	59.90	11.94
18	61.22	11.88
19	0.49	0.10
20	63.06	12.35
21	59.43	12.02
22	0.49	0.10
23	63.11	12.42
24	62.87	12.42
25	0.49	0.10
26	62.69	12.40
27	61.41	11.89

Table 24. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_20						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.63%	*97.59%*	*97.71%*	97.57%	*97.46%*	*97.70%*
3	99.34%	*99.31%*	*99.38%*	99.31%	*99.30%*	*99.33%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.88%	*94.70%*	*95.07%*	94.41%	*94.31%*	*94.50%*
6	96.40%	*96.30%*	*96.47%*	96.22%	*96.12%*	*96.31%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.93%	*94.82%*	*95.03%*	94.78%	*94.60%*	*95.02%*
9	97.55%	*97.51%*	*97.58%*	97.51%	*97.46%*	*97.64%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	88.15%	*86.05%*	*90.11%*	81.72%	*79.65%*	*83.76%*
12	99.15%	*99.13%*	*99.18%*	99.12%	*99.11%*	*99.14%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	87.25%	*85.43%*	*88.57%*	83.73%	*82.77%*	*85.13%*
15	96.97%	*96.94%*	*97.02%*	96.89%	*96.86%*	*96.93%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	89.05%	*87.89%*	*89.72%*	82.50%	*79.65%*	*85.11%*
18	96.44%	*96.39%*	*96.54%*	96.29%	*96.21%*	*96.45%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	72.76%	*68.09%*	*76.72%*	54.26%	*50.41%*	*61.56%*
21	77.03%	*73.90%*	*80.05%*	64.79%	*61.87%*	*67.92%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	76.55%	*74.24%*	*78.20%*	75.03%	*73.70%*	*76.72%*
24	87.34%	*84.83%*	*89.60%*	76.13%	*73.06%*	*80.07%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	77.71%	*75.89%*	*78.87%*	64.70%	*59.75%*	*68.13%*
27	82.83%	*81.34%*	*85.29%*	68.22%	*63.92%*	*71.09%*

Table 25. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_20													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	26	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	97	-	1	1	1	1	48	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	54	111	173	477	-	-	143	385	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	17	27	81	-	-	-	43	118	330	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	55	94	176	501	-	-	168	322	406	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	305	-	-	-	-	-	-	-	-	-	-	-	
21	185	463	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	133	-	-	-	-	-	322	-	-	-	-	-	
24	108	151	199	-	-	-	383	435	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	295	-	-	-	-	-	-	-	-	-	-	-	
27	190	278	473	-	-	-	-	-	-	-	-	-	

Table 26. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_20		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.57	0.10
2	61.69	12.00
3	60.46	11.90
4	0.48	0.10
5	60.00	11.76
6	59.39	11.66
7	0.48	0.10
8	60.98	11.93
9	60.18	11.62
10	0.48	0.09
11	61.11	11.81
12	57.87	11.56
13	0.49	0.11
14	61.46	12.31
15	61.96	12.09
16	0.49	0.10
17	61.61	12.10
18	60.47	11.68
19	0.48	0.10
20	62.12	12.72
21	64.73	12.65
22	0.49	0.10
23	63.76	12.76
24	62.05	12.43
25	0.47	0.10
26	63.71	12.81
27	64.62	12.34

Table 27. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_5						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.69%	*99.64%*	*99.79%*	98.74%	*98.60%*	*98.99%*
3	99.87%	*99.82%*	*99.92%*	99.59%	*99.52%*	*99.69%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.76%	*98.37%*	*99.06%*	97.00%	*96.66%*	*97.48%*
6	99.29%	*99.17%*	*99.42%*	98.07%	*97.85%*	*98.35%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.22%	*99.09%*	*99.49%*	97.34%	*96.92%*	*97.70%*
9	99.61%	*99.59%*	*99.65%*	98.90%	*98.80%*	*99.01%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.36%	*95.15%*	*97.00%*	89.47%	*87.25%*	*91.32%*
12	99.80%	*99.72%*	*99.85%*	99.38%	*99.26%*	*99.57%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.34%	*96.85%*	*97.75%*	93.65%	*93.01%*	*94.38%*
15	98.14%	*98.05%*	*98.25%*	97.36%	*97.15%*	*97.62%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.93%	*96.47%*	*97.31%*	91.75%	*90.24%*	*93.08%*
18	98.70%	*98.51%*	*98.80%*	97.26%	*97.13%*	*97.41%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	90.34%	*89.34%*	*90.85%*	75.67%	*74.33%*	*77.25%*
21	94.72%	*92.73%*	*96.13%*	83.26%	*80.46%*	*86.27%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	93.67%	*92.65%*	*95.09%*	85.13%	*83.11%*	*87.25%*
24	95.55%	*95.04%*	*96.06%*	81.56%	*79.50%*	*84.37%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	94.37%	*92.04%*	*96.02%*	79.39%	*77.04%*	*82.10%*
27	93.82%	*91.90%*	*95.64%*	83.35%	*80.51%*	*85.54%*

Table 28. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_5													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	15	-	1	1	1	1	73	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	17	-	1	1	1	1	37	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	16	32	62	158	390	-	29	107	249	439	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	19	28	39	89	247	-	36	55	101	220	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	26	42	67	121	283	-	57	101	217	379	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	201	255	342	455	-	-	416	-	-	-	-	-	
21	92	123	176	267	454	-	272	393	438	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	183	219	265	371	491	-	227	339	427	-	-	-	
24	62	80	116	191	452	-	273	388	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	151	181	242	334	450	-	383	469	-	-	-	-	
27	86	124	169	281	395	-	279	392	482	-	-	-	

Table 29. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_5		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.40	0.08
2	56.52	11.42
3	55.32	10.96
4	0.40	0.08
5	57.91	11.42
6	56.64	10.71
7	0.40	0.08
8	58.79	11.38
9	56.43	11.34
10	0.40	0.08
11	57.37	10.92
12	55.14	10.68
13	0.38	0.08
14	55.48	10.79
15	54.63	10.51
16	0.39	0.08
17	55.55	10.90
18	55.06	10.61
19	0.38	0.08
20	53.71	10.80
21	54.45	11.33
22	0.40	0.08
23	54.63	10.65
24	55.81	11.02
25	0.40	0.08
26	55.16	11.06
27	57.59	11.38

Table 30. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_7						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.78%	*99.70%*	*99.82%*	98.90%	*98.75%*	*99.03%*
3	99.91%	*99.86%*	*99.94%*	99.68%	*99.65%*	*99.72%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.76%	*98.48%*	*98.93%*	97.25%	*96.88%*	*97.96%*
6	99.21%	*99.07%*	*99.37%*	98.29%	*98.18%*	*98.40%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.27%	*99.16%*	*99.46%*	97.60%	*97.19%*	*98.16%*
9	99.69%	*99.60%*	*99.79%*	98.82%	*98.59%*	*99.12%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.21%	*94.48%*	*97.85%*	90.02%	*88.46%*	*92.43%*
12	99.83%	*99.77%*	*99.88%*	99.41%	*99.33%*	*99.52%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.75%	*97.34%*	*98.05%*	93.97%	*93.36%*	*95.52%*
15	98.30%	*97.85%*	*98.59%*	97.45%	*97.23%*	*97.67%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.94%	*96.37%*	*97.39%*	91.87%	*90.67%*	*92.63%*
18	98.87%	*98.67%*	*99.22%*	97.40%	*97.20%*	*97.69%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	92.38%	*88.80%*	*94.80%*	75.41%	*69.97%*	*80.63%*
21	95.63%	*93.38%*	*98.00%*	80.66%	*77.19%*	*82.83%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	96.00%	*94.79%*	*97.49%*	87.21%	*84.44%*	*88.95%*
24	96.04%	*95.27%*	*96.88%*	85.77%	*83.67%*	*87.51%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	95.06%	*93.99%*	*96.07%*	81.26%	*78.88%*	*85.81%*
27	94.81%	*93.60%*	*96.82%*	82.38%	*81.01%*	*83.94%*

Table 31. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_7												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	16	-	1	1	1	1	66	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	10	-	1	1	1	1	48	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	15	33	56	115	333	-	33	98	220	474	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	16	23	36	74	204	-	30	46	85	217	435	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	24	36	60	117	294	-	57	102	185	367	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	2
20	138	182	251	334	-	-	400	485	-	-	-	-
21	85	111	154	243	400	-	305	409	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	108	134	166	248	425	-	170	245	377	-	-	-
24	60	77	119	167	398	-	181	252	404	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	116	145	200	285	448	-	330	364	499	-	-	-
27	86	113	157	249	399	-	257	409	-	-	-	-

Table 32. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_7		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.40	0.08
2	59.83	11.45
3	56.83	11.23
4	0.39	0.08
5	57.77	11.52
6	59.13	11.40
7	0.38	0.08
8	56.80	11.13
9	56.90	11.25
10	0.38	0.08
11	56.93	11.14
12	56.99	11.02
13	0.38	0.08
14	57.99	11.22
15	56.37	11.10
16	0.39	0.08
17	56.30	11.27
18	58.83	11.54
19	0.40	0.09
20	58.34	11.45
21	57.67	11.56
22	0.40	0.08
23	56.34	11.54
24	58.28	11.29
25	0.38	0.08
26	55.98	11.28
27	58.37	11.52

Table 33. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	99.75%	99.69%	99.85%	98.97%	98.86%	99.06%
3	99.93%	99.92%	99.95%	99.65%	99.55%	99.70%
4	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
5	99.03%	98.60%	99.54%	97.21%	96.37%	98.02%
6	99.33%	99.26%	99.44%	98.28%	97.96%	98.47%
7	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
8	99.39%	99.26%	99.55%	97.70%	97.62%	97.80%
9	99.64%	99.55%	99.70%	98.82%	98.71%	98.90%
10	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
11	95.63%	94.89%	96.76%	90.39%	88.82%	91.21%
12	99.83%	99.78%	99.87%	99.38%	99.34%	99.42%
13	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
14	97.71%	97.52%	97.97%	94.43%	93.60%	95.44%
15	98.50%	98.35%	98.61%	97.43%	97.34%	97.62%
16	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
17	96.97%	96.33%	97.63%	91.59%	90.38%	92.57%
18	99.07%	98.94%	99.21%	97.31%	97.03%	97.55%
19	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
20	92.00%	88.45%	95.08%	76.95%	74.51%	78.73%
21	95.79%	94.19%	98.12%	83.06%	79.94%	84.95%
22	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
23	96.62%	95.88%	97.34%	87.59%	86.14%	90.34%
24	96.09%	95.17%	97.39%	85.61%	81.60%	88.01%
25	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
26	95.94%	94.53%	97.46%	83.29%	82.40%	84.24%
27	95.96%	95.21%	96.56%	81.52%	78.36%	83.94%

Table 34. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_10													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	13	-	1	1	1	1	68	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	12	-	1	1	1	1	28	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	16	32	59	126	264	-	33	101	234	373	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	16	23	36	82	206	-	34	50	74	180	466	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	22	33	59	125	289	-	50	90	153	367	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	129	169	251	378	498	-	392	-	-	-	-	-	
21	77	110	169	246	407	-	287	366	501	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	2	
23	88	106	145	213	364	-	157	228	344	478	-	-	
24	57	76	109	191	364	-	195	282	402	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	101	128	183	272	427	-	292	397	-	-	-	-	
27	81	99	138	214	418	-	301	404	-	-	-	-	

Table 35. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_10		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.39	0.08
2	57.51	11.57
3	57.87	11.50
4	0.38	0.08
5	56.71	11.31
6	59.31	11.69
7	0.40	0.08
8	59.33	12.00
9	60.59	12.13
10	0.41	0.08
11	60.67	11.92
12	59.41	12.03
13	0.40	0.08
14	58.53	11.54
15	56.99	11.91
16	0.40	0.08
17	57.67	11.66
18	57.73	11.45
19	0.38	0.08
20	56.82	11.23
21	57.33	11.76
22	0.41	0.08
23	57.11	11.71
24	58.75	11.46
25	0.39	0.08
26	56.68	11.53
27	57.77	11.46

Table 36. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LIN						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.77%	*99.74%*	*99.81%*	98.94%	*98.88%*	*99.10%*
3	99.95%	*99.93%*	*99.97%*	99.65%	*99.62%*	*99.69%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.75%	*98.52%*	*99.14%*	97.56%	*97.36%*	*98.04%*
6	99.44%	*99.31%*	*99.61%*	98.08%	*97.81%*	*98.26%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.35%	*99.22%*	*99.44%*	97.77%	*97.39%*	*97.96%*
9	99.73%	*99.67%*	*99.77%*	98.82%	*98.54%*	*99.10%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.72%	*95.93%*	*97.70%*	91.47%	*89.09%*	*93.49%*
12	99.84%	*99.80%*	*99.86%*	99.42%	*99.37%*	*99.51%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	98.04%	*97.87%*	*98.30%*	94.34%	*94.03%*	*95.21%*
15	98.19%	*98.02%*	*98.53%*	97.52%	*97.41%*	*97.70%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	97.38%	*96.88%*	*97.88%*	92.15%	*91.30%*	*93.11%*
18	99.02%	*98.90%*	*99.17%*	97.77%	*97.45%*	*98.15%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	93.52%	*92.69%*	*95.67%*	79.39%	*77.04%*	*82.16%*
21	95.17%	*93.51%*	*97.15%*	82.51%	*80.99%*	*83.87%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	96.99%	*95.81%*	*98.08%*	87.18%	*84.81%*	*88.75%*
24	95.88%	*95.19%*	*96.84%*	84.22%	*80.18%*	*87.12%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	96.17%	*95.09%*	*97.12%*	82.32%	*80.61%*	*83.52%*
27	94.89%	*91.74%*	*96.25%*	85.37%	*83.98%*	*87.50%*

Table 37. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LIN												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	13	-	1	1	1	1	68	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	10	-	1	1	1	1	35	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	10	24	55	129	315	-	27	74	182	393	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	2
14	14	18	27	61	177	-	27	44	88	200	449	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	20	32	52	100	248	-	51	97	193	327	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	107	136	189	328	438	-	406	456	-	-	-	-
21	86	112	156	244	386	-	240	367	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	2
23	66	85	116	186	333	-	182	276	370	-	-	-
24	61	80	113	191	406	-	222	347	414	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	80	101	138	216	401	-	299	408	-	-	-	-
27	76	111	164	267	421	-	210	333	444	-	-	-

Table 38. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ORDER_LIN		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.40	0.08
2	58.47	11.98
3	60.11	12.18
4	0.40	0.08
5	58.30	11.67
6	57.66	11.68
7	0.39	0.08
8	58.13	11.68
9	58.62	11.69
10	0.39	0.08
11	57.48	11.87
12	58.46	11.71
13	0.38	0.08
14	57.90	11.61
15	58.16	11.72
16	0.40	0.08
17	59.96	12.11
18	60.99	12.24
19	0.40	0.08
20	60.82	11.98
21	58.16	11.56
22	0.38	0.08
23	59.04	11.85
24	60.44	11.74
25	0.38	0.08
26	57.54	11.53
27	57.70	11.58

Table 39. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LOG						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.79%	*99.72%*	*99.86%*	98.99%	*98.82%*	*99.22%*
3	99.92%	*99.91%*	*99.93%*	99.65%	*99.56%*	*99.71%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.94%	*98.64%*	*99.25%*	97.17%	*96.87%*	*97.53%*
6	99.37%	*99.21%*	*99.55%*	98.52%	*98.36%*	*98.68%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.39%	*99.29%*	*99.45%*	97.63%	*97.11%*	*98.07%*
9	99.63%	*99.58%*	*99.69%*	98.95%	*98.84%*	*99.11%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.64%	*95.41%*	*97.79%*	90.83%	*88.93%*	*92.01%*
12	99.84%	*99.81%*	*99.88%*	99.42%	*99.36%*	*99.46%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.91%	*97.61%*	*98.41%*	94.89%	*94.56%*	*95.54%*
15	98.32%	*98.20%*	*98.42%*	97.35%	*97.21%*	*97.48%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	97.68%	*97.22%*	*98.22%*	92.64%	*92.41%*	*92.92%*
18	99.06%	*98.75%*	*99.38%*	97.60%	*97.38%*	*97.81%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	93.05%	*90.28%*	*95.06%*	80.71%	*79.33%*	*81.68%*
21	95.40%	*93.55%*	*97.18%*	83.21%	*80.63%*	*86.90%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	96.83%	*96.27%*	*97.57%*	86.59%	*84.51%*	*89.08%*
24	96.17%	*95.38%*	*97.24%*	86.60%	*85.04%*	*89.12%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	94.77%	*93.99%*	*95.98%*	84.06%	*81.74%*	*86.81%*
27	95.69%	*95.35%*	*96.03%*	84.35%	*80.47%*	*88.85%*

Table 40. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LOG													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	11	-	1	1	1	1	49	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	11	-	1	1	1	1	31	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	11	24	47	96	301	-	29	83	220	395	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	2	
14	15	21	32	70	207	-	28	43	77	172	458	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	21	31	50	92	224	-	54	87	147	296	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	114	156	212	340	477	-	343	408	-	-	-	-	
21	73	102	152	215	391	-	248	342	310	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	72	91	123	197	381	-	177	280	388	-	-	-	
24	50	70	91	165	392	-	191	246	424	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	90	116	167	265	487	-	246	357	446	-	-	-	
27	79	103	144	214	435	-	220	331	372	-	-	-	

Table 41. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ORDER_LOG		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.40	12.03
2	59.64	11.86
3	58.89	11.92
4	0.39	0.08
5	59.02	11.86
6	58.43	11.89
7	0.39	0.08
8	58.97	12.30
9	61.66	12.18
10	0.39	0.08
11	59.78	12.37
12	62.44	12.33
13	0.39	0.09
14	61.79	12.38
15	60.80	12.37
16	0.41	0.08
17	61.64	12.35
18	59.85	11.90
19	0.39	0.08
20	58.55	12.20
21	61.76	12.08
22	0.41	0.08
23	61.48	12.38
24	61.86	12.37
25	0.41	0.08
26	59.59	12.10
27	58.96	11.86

Table 42. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.67%	*99.57%*	*99.79%*	98.91%	*98.81%*	*98.99%*
3	99.88%	*99.85%*	*99.93%*	99.60%	*99.56%*	*99.63%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.46%	*98.28%*	*98.65%*	96.87%	*96.60%*	*97.18%*
6	99.33%	*99.22%*	*99.54%*	98.29%	*98.17%*	*98.44%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.05%	*98.83%*	*99.39%*	97.49%	*97.08%*	*97.71%*
9	99.60%	*99.52%*	*99.69%*	98.67%	*98.56%*	*98.75%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.17%	*93.79%*	*96.25%*	88.69%	*86.44%*	*90.20%*
12	99.78%	*99.72%*	*99.82%*	99.40%	*99.30%*	*99.51%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.41%	*96.85%*	*97.80%*	94.11%	*93.42%*	*94.53%*
15	98.05%	*97.96%*	*98.12%*	97.38%	*97.31%*	*97.46%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.43%	*95.83%*	*97.13%*	91.06%	*89.98%*	*92.62%*
18	98.70%	*98.34%*	*98.98%*	97.63%	*97.32%*	*97.77%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	91.48%	*87.83%*	*94.20%*	76.04%	*72.53%*	*79.97%*
21	94.10%	*90.96%*	*95.78%*	80.12%	*77.40%*	*83.85%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	95.10%	*93.67%*	*96.67%*	85.12%	*82.79%*	*89.16%*
24	94.68%	*94.03%*	*95.85%*	85.74%	*83.73%*	*87.36%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	93.88%	*92.48%*	*95.69%*	80.95%	*76.80%*	*87.24%*
27	94.51%	*92.13%*	*96.36%*	82.18%	*77.80%*	*86.22%*

Table 43. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_10												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	8	-	1	1	1	1	45	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	2
8	1	1	1	1	9	-	1	1	1	1	30	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	12	27	52	125	435	-	34	109	235	413	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	12	16	28	64	172	-	24	37	71	207	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	21	31	52	99	313	-	62	110	200	377	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	114	150	224	329	-	-	430	-	-	-	-	-
21	68	98	165	286	400	-	291	412	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	54	68	100	173	349	-	210	283	351	-	-	-
24	65	87	130	215	340	-	213	333	431	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	79	102	140	240	433	-	325	437	432	-	-	-
27	84	111	150	254	355	-	298	397	450	-	-	-

Table 44. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

	TOP_10	
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.73	0.09
2	55.53	10.45
3	54.85	10.67
4	0.90	0.09
5	51.86	11.02
6	57.91	10.84
7	0.74	0.08
8	54.42	10.61
9	54.91	10.76
10	0.74	0.08
11	52.91	10.49
12	54.69	10.67
13	0.91	0.09
14	52.61	10.59
15	54.60	10.71
16	0.80	0.09
17	53.83	10.52
18	57.15	10.65
19	0.77	0.08
20	55.57	10.75
21	56.63	11.00
22	0.90	0.09
23	52.06	10.43
24	54.69	10.59
25	0.84	0.09
26	52.23	10.44
27	54.45	10.62

Table 45. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_20						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.61%	*99.51%*	*99.71%*	98.87%	*98.73%*	*98.98%*
3	99.88%	*99.82%*	*99.95%*	99.59%	*99.51%*	*99.72%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.63%	*98.11%*	*98.97%*	96.84%	*96.25%*	*97.17%*
6	99.26%	*98.87%*	*99.46%*	98.06%	*97.64%*	*98.29%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	98.88%	*98.84%*	*98.96%*	97.24%	*96.87%*	*97.76%*
9	99.54%	*99.38%*	*99.69%*	98.75%	*98.63%*	*98.88%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.50%	*94.61%*	*97.22%*	90.18%	*87.34%*	*92.52%*
12	99.70%	*99.67%*	*99.74%*	99.38%	*99.25%*	*99.44%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.16%	*96.43%*	*97.48%*	93.05%	*91.57%*	*93.99%*
15	97.95%	*97.71%*	*98.15%*	97.27%	*97.13%*	*97.55%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.49%	*96.01%*	*96.97%*	90.73%	*89.36%*	*92.91%*
18	98.93%	*98.62%*	*99.13%*	97.21%	*96.91%*	*97.53%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	91.40%	*87.61%*	*93.26%*	74.88%	*70.85%*	*79.82%*
21	94.36%	*93.79%*	*94.68%*	81.01%	*79.15%*	*82.13%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	94.76%	*93.04%*	*96.50%*	82.47%	*79.79%*	*87.11%*
24	95.21%	*93.93%*	*96.31%*	84.54%	*77.22%*	*88.50%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	93.45%	*92.49%*	*95.24%*	82.39%	*79.80%*	*83.89%*
27	94.19%	*93.06%*	*95.06%*	81.84%	*78.25%*	*85.67%*

Table 46. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_20												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	13	-	1	1	1	1	57	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	13	-	1	1	1	1	32	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	2
11	13	28	52	118	377	-	34	110	230	418	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	17	23	33	77	215	-	31	49	85	206	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	26	39	61	105	290	-	62	120	219	323	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	141	180	251	361	-	-	437	-	-	-	-	-
21	79	122	173	275	-	-	290	434	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	114	143	185	269	372	-	262	369	414	-	-	-
24	64	84	119	203	383	-	244	297	395	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	108	148	201	307	491	-	307	424	-	-	-	-
27	84	112	168	280	483	-	293	365	490	-	-	-

Table 47. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

TOP_20		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	1.15	0.09
2	55.75	10.31
3	63.48	10.35
4	1.29	0.11
5	56.68	10.15
6	65.41	10.45
7	1.26	0.10
8	57.20	10.26
9	64.39	10.41
10	1.22	0.10
11	58.03	10.35
12	62.95	10.33
13	1.34	0.12
14	55.89	10.40
15	65.59	10.53
16	1.32	0.11
17	58.02	10.90
18	70.42	10.74
19	1.27	0.10
20	59.58	10.64
21	68.04	10.56
22	1.41	0.11
23	56.58	10.59
24	64.19	10.71
25	1.43	0.12
26	57.16	10.58
27	62.34	10.31

Table 48. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_30						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.40%	*99.32%*	*99.59%*	98.51%	*98.43%*	*98.63%*
3	99.83%	*99.76%*	*99.87%*	99.52%	*99.47%*	*99.57%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.23%	*97.90%*	*98.57%*	96.23%	*95.93%*	*96.54%*
6	99.09%	*98.92%*	*99.30%*	98.05%	*97.75%*	*98.46%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	98.76%	*98.63%*	*99.09%*	97.06%	*96.68%*	*97.46%*
9	99.34%	*99.29%*	*99.46%*	98.45%	*98.29%*	*98.67%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.00%	*93.61%*	*96.30%*	87.59%	*84.75%*	*88.99%*
12	99.68%	*99.59%*	*99.77%*	99.27%	*99.20%*	*99.31%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	92.33%	*86.05%*	*96.44%*	91.28%	*90.70%*	*92.49%*
15	97.91%	*97.71%*	*98.04%*	97.26%	*96.96%*	*97.36%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	95.33%	*94.73%*	*95.99%*	89.20%	*88.53%*	*90.78%*
18	98.44%	*98.11%*	*98.95%*	96.78%	*96.61%*	*96.95%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	60.40%	*56.29%*	*64.49%*	68.67%	*63.13%*	*75.44%*
21	92.47%	*91.40%*	*93.10%*	75.52%	*69.05%*	*79.01%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	25.66%	*21.23%*	*36.67%*	82.48%	*77.78%*	*85.46%*
24	88.58%	*74.48%*	*96.14%*	82.34%	*78.96%*	*84.57%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	42.93%	*33.45%*	*54.37%*	77.58%	*72.56%*	*80.68%*
27	92.54%	*89.69%*	*94.28%*	75.71%	*72.14%*	*78.93%*

Table 49. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_30												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	31	-	1	1	1	1	117	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	20	-	1	1	1	1	70	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	19	36	66	147	357	-	72	156	313	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	25	37	67	121	350	-	43	62	130	368	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	37	54	89	145	408	-	81	135	274	459	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	-	-	-	-	-	-	485	-	-	-	-	-
21	114	147	216	380	-	-	408	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	2
23	-	-	-	-	-	-	242	386	486	-	-	-
24	101	221	294	332	324	-	297	342	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	-	-	-	-	-	-	393	484	-	-	-	-
27	122	166	222	339	-	-	412	-	-	-	-	-

Table 50. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

	TOP_30	
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	1.65	0.11
2	63.45	10.06
3	79.64	10.01
4	1.86	0.15
5	65.81	9.88
6	82.80	10.24
7	1.69	0.11
8	63.14	9.98
9	82.45	10.23
10	1.72	0.11
11	62.65	9.83
12	86.15	9.88
13	1.90	0.14
14	63.76	9.73
15	80.83	9.83
16	1.80	0.13
17	65.82	9.96
18	82.61	10.00
19	1.74	0.11
20	52.58	9.96
21	80.56	10.18
22	1.97	0.16
23	50.09	9.46
24	70.70	10.04
25	1.91	0.13
26	52.34	9.71
27	77.64	10.21

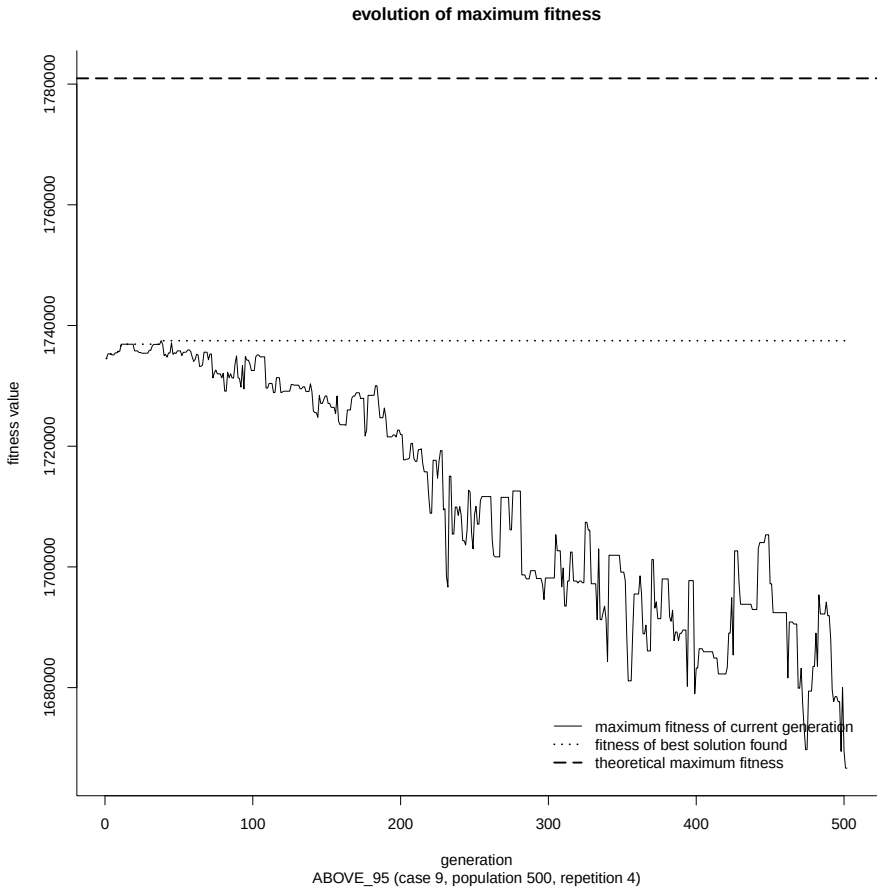

Fig. 2. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

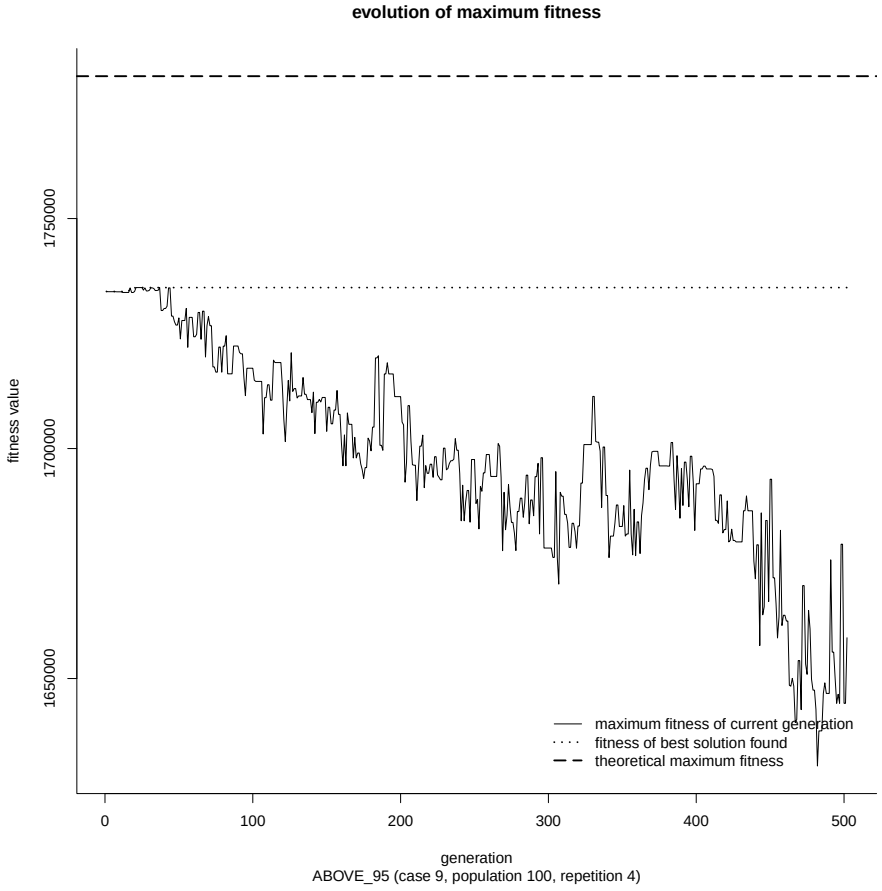

Fig. 3. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

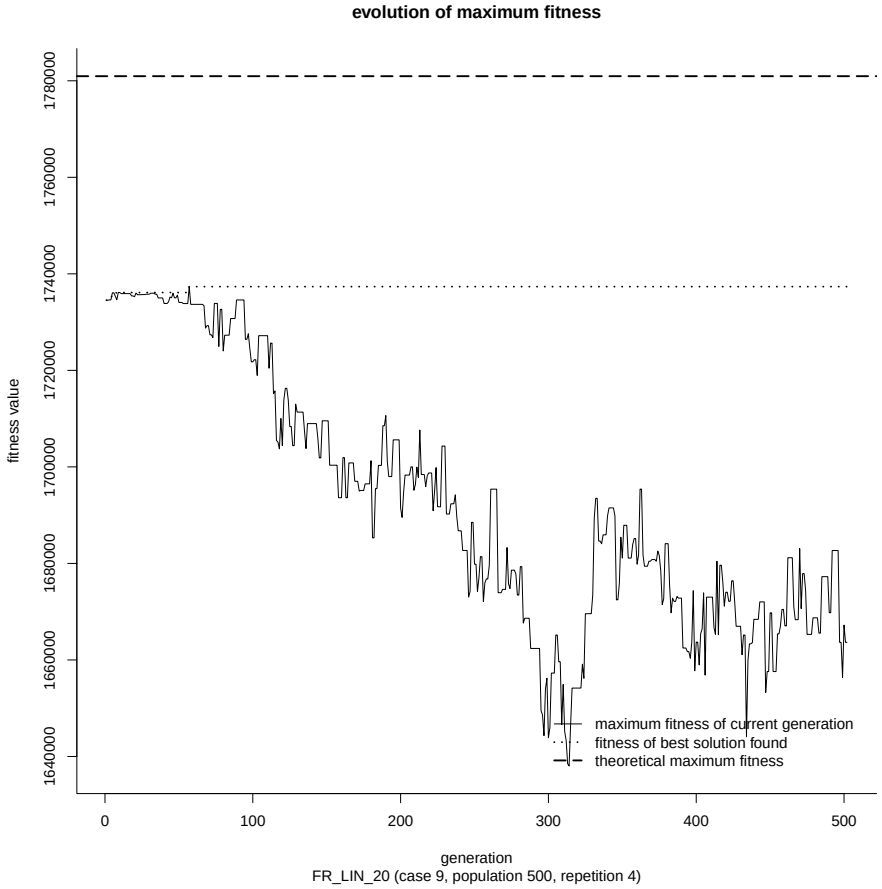

Fig. 4. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

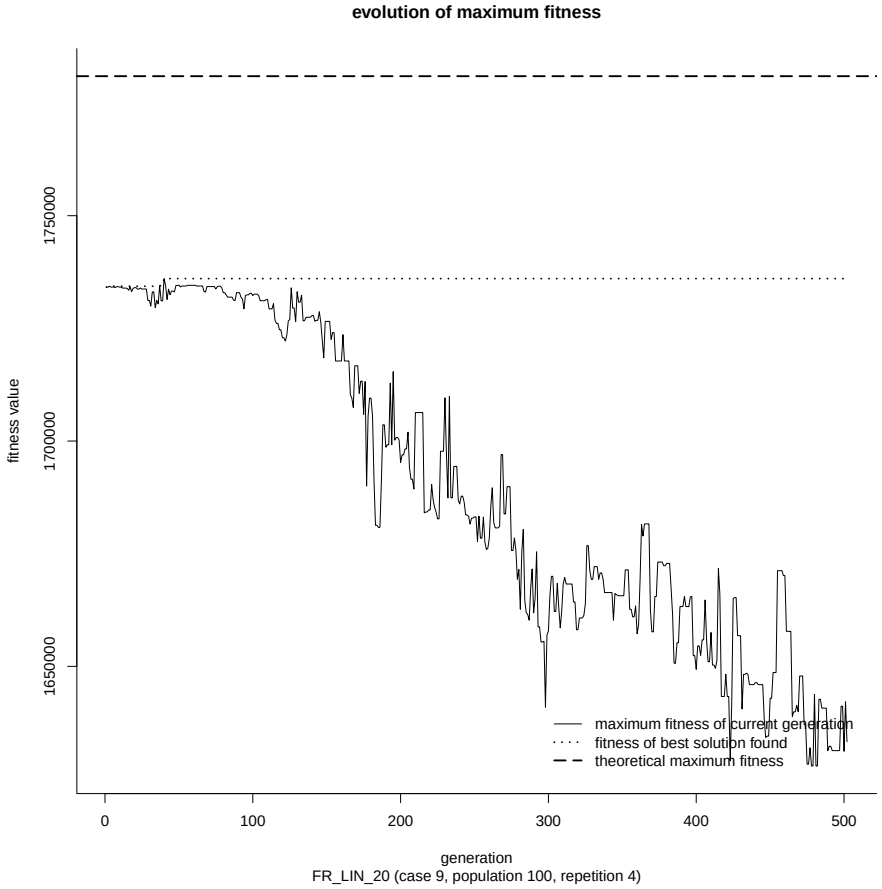

Fig. 5. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

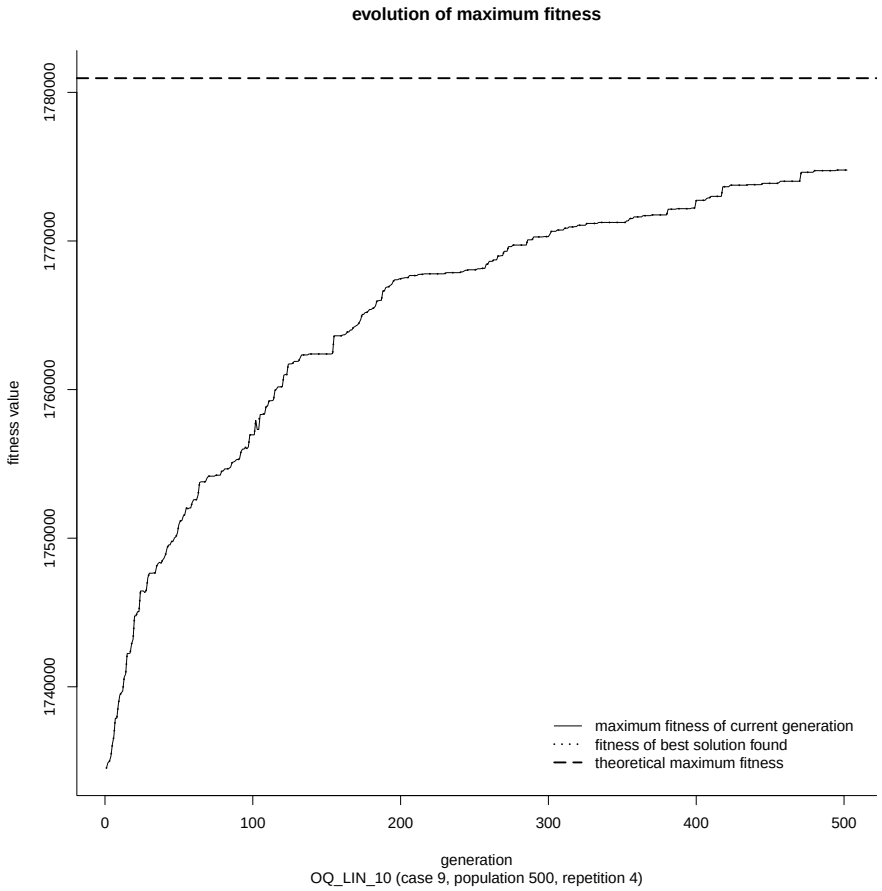

Fig. 6. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

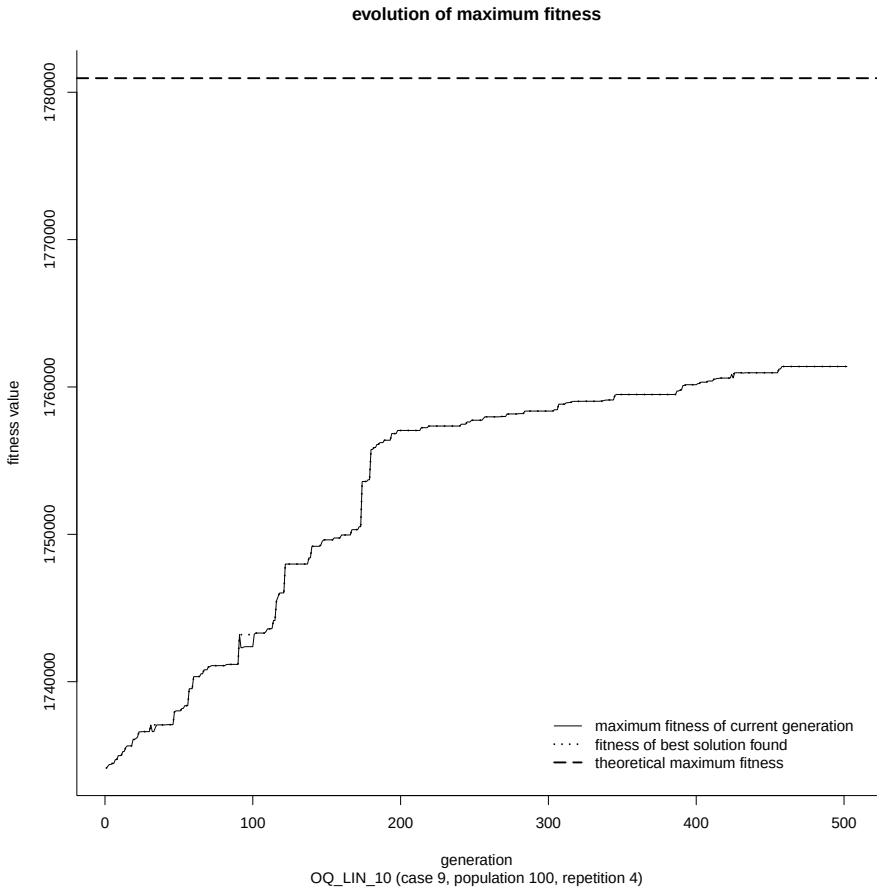

Fig. 7. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

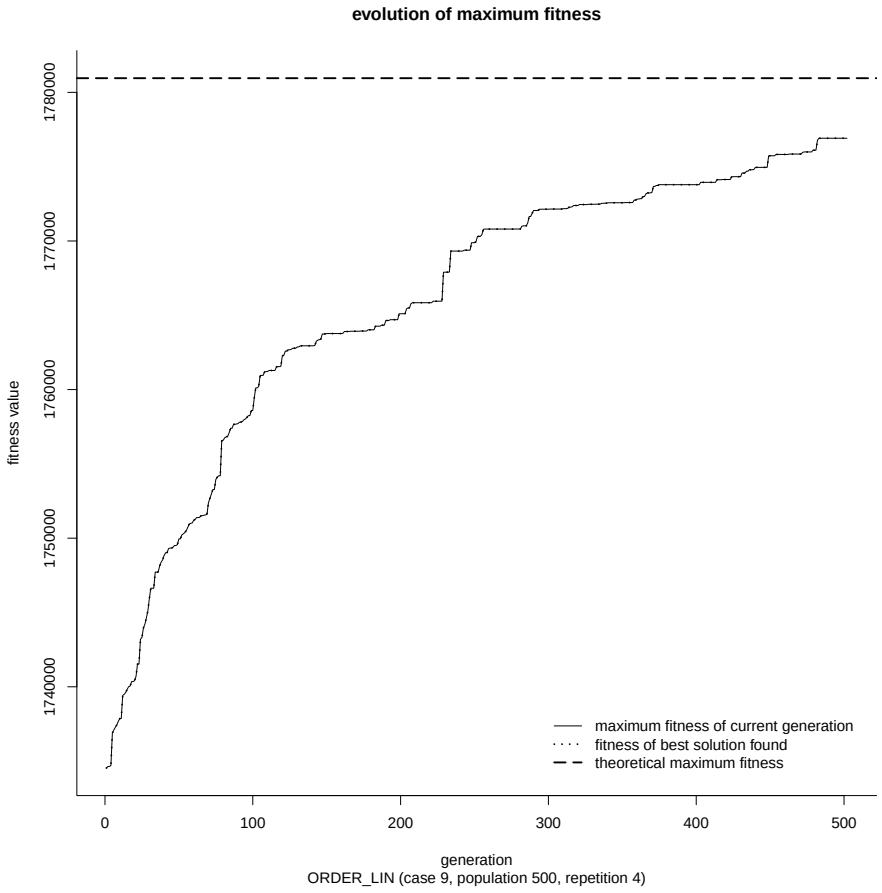

Fig. 8. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

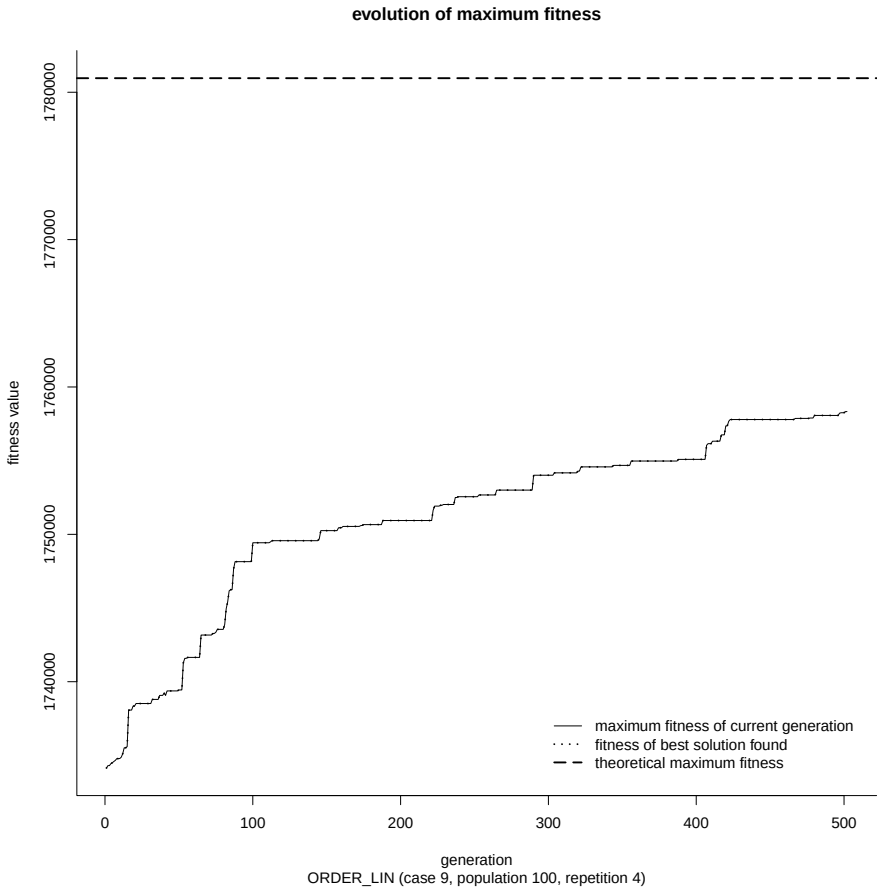

Fig. 9. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

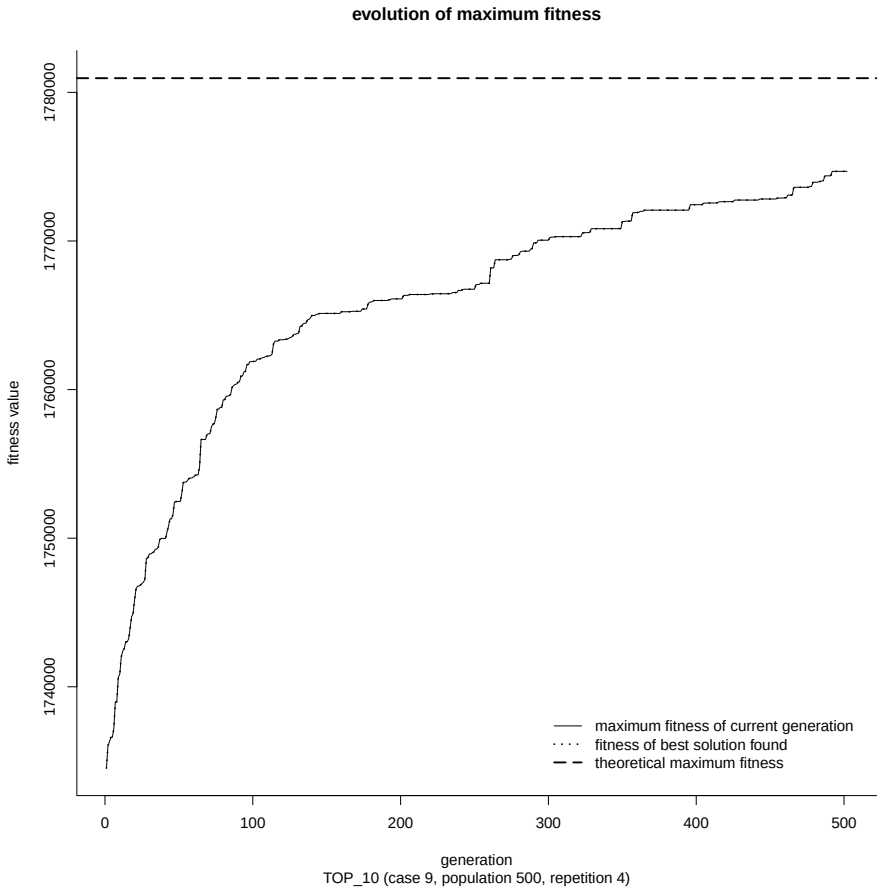

Fig. 10. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

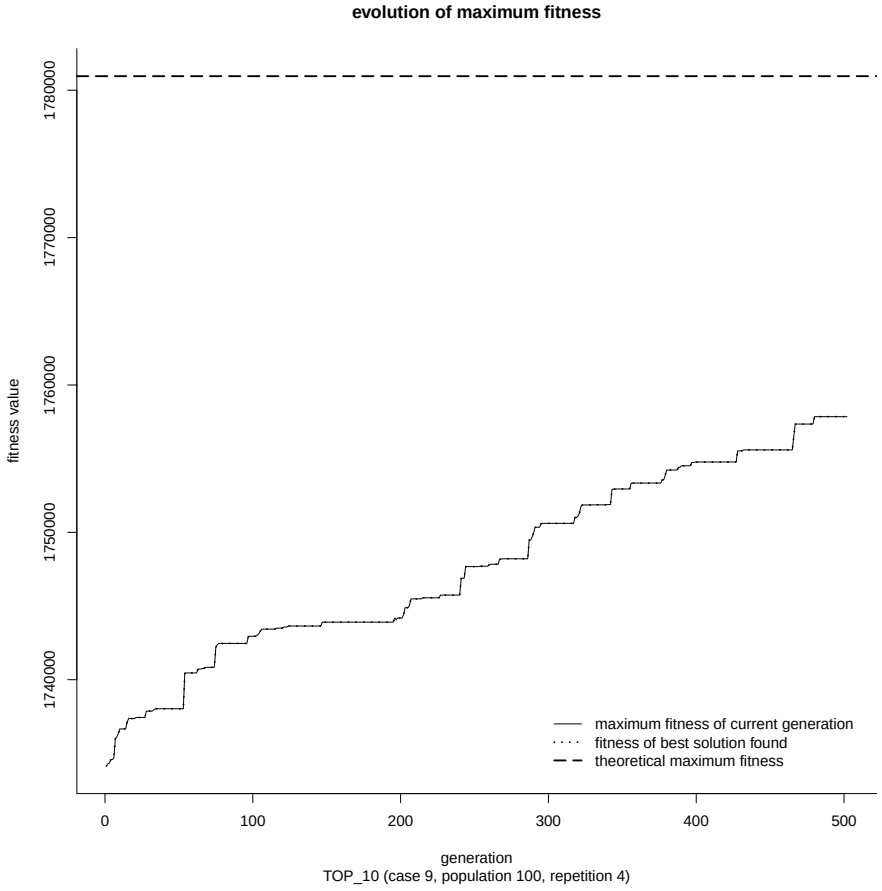

Fig. 11. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

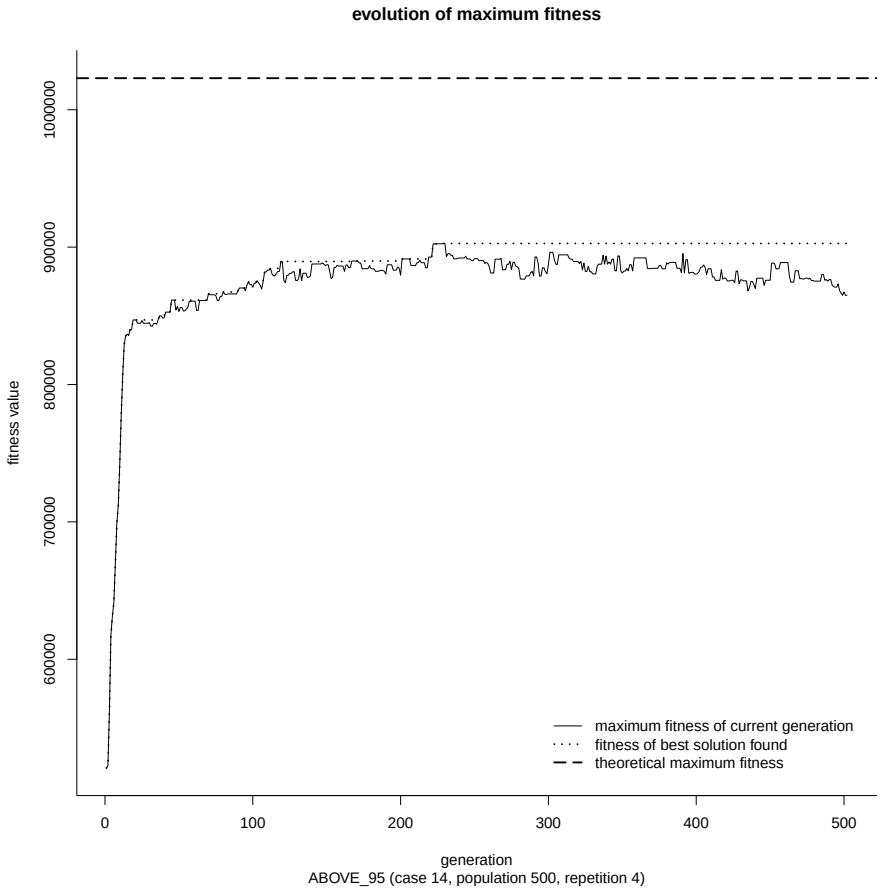

Fig. 12. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

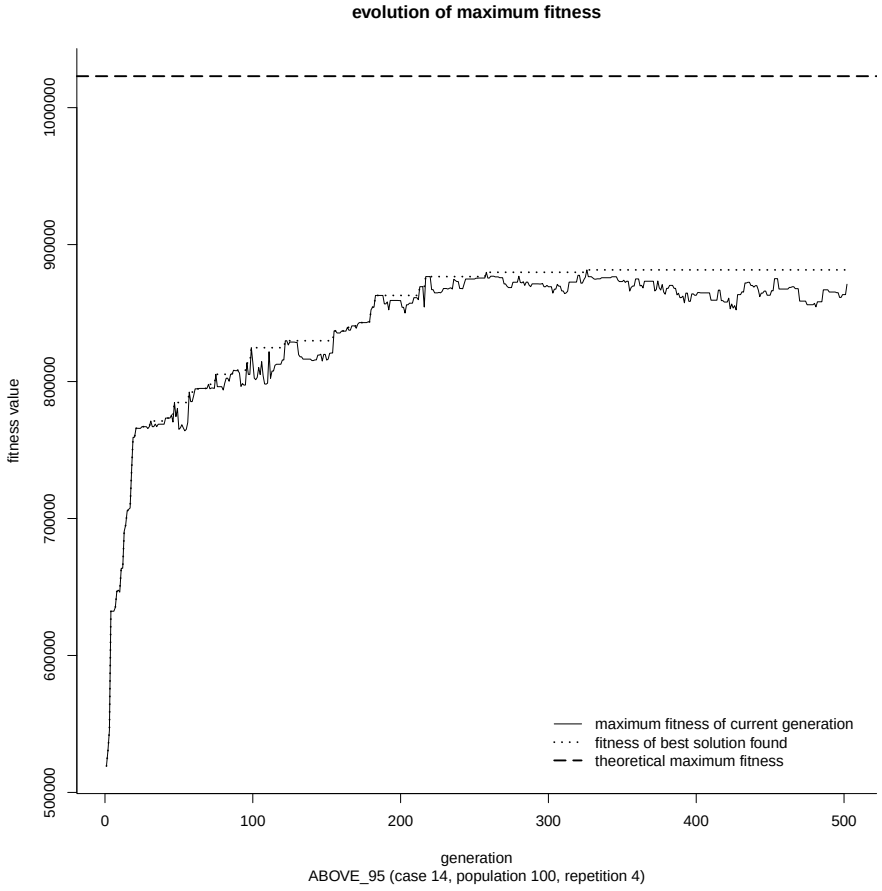

Fig. 13. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

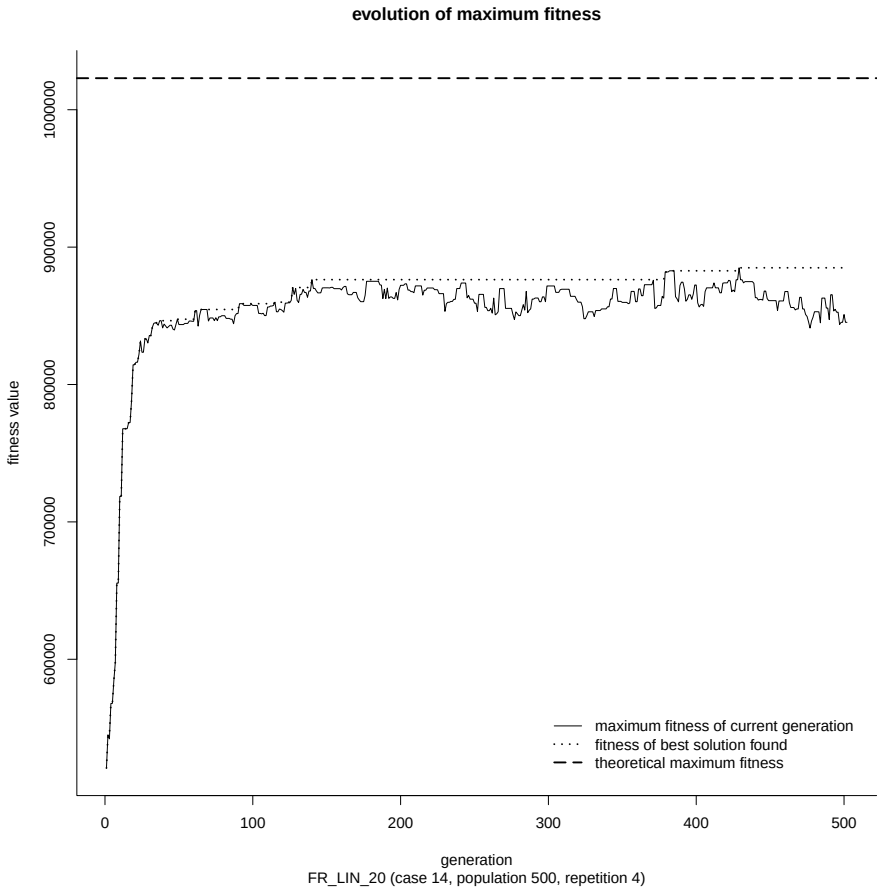

Fig. 14. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

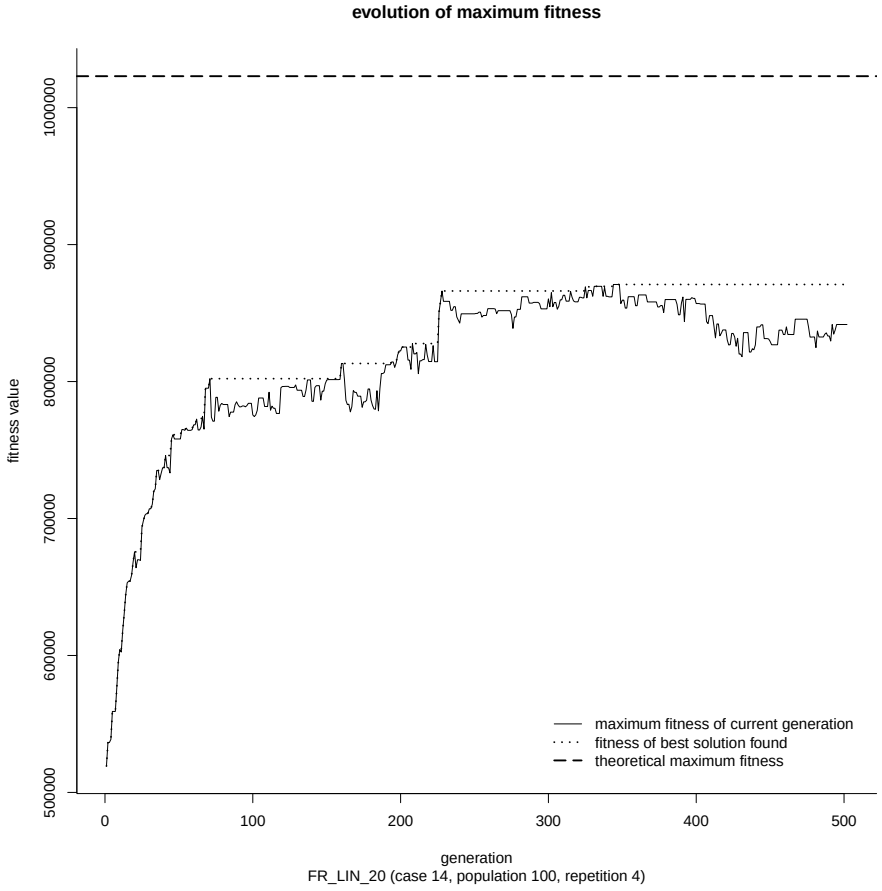

Fig. 15. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

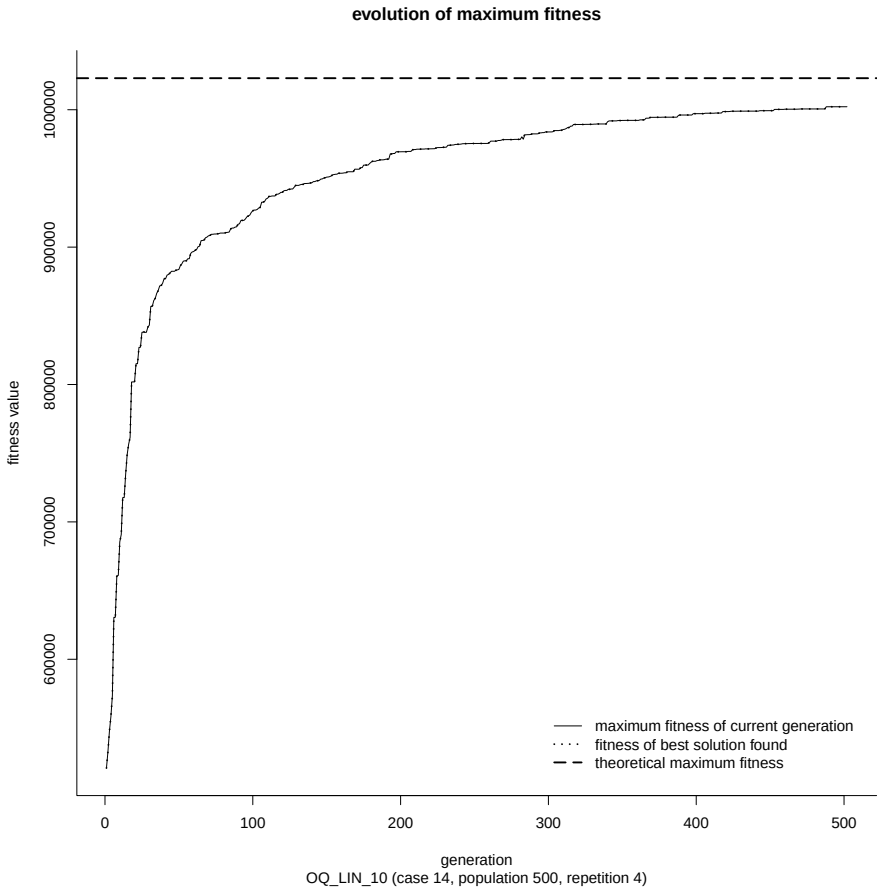

Fig. 16. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

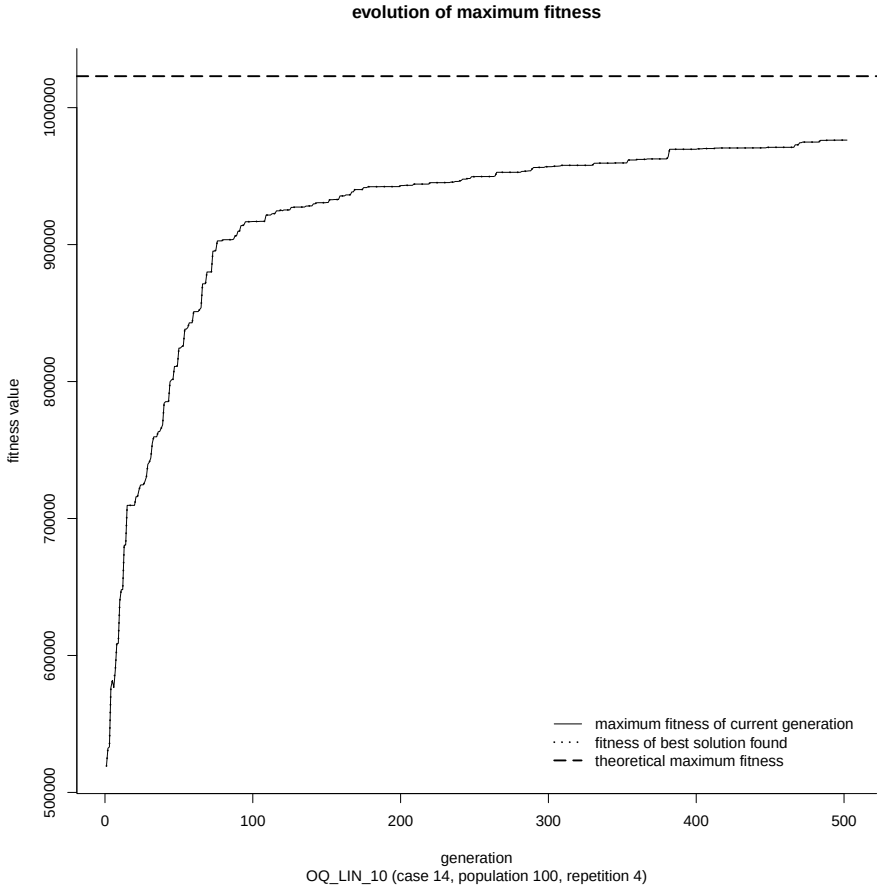

Fig. 17. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

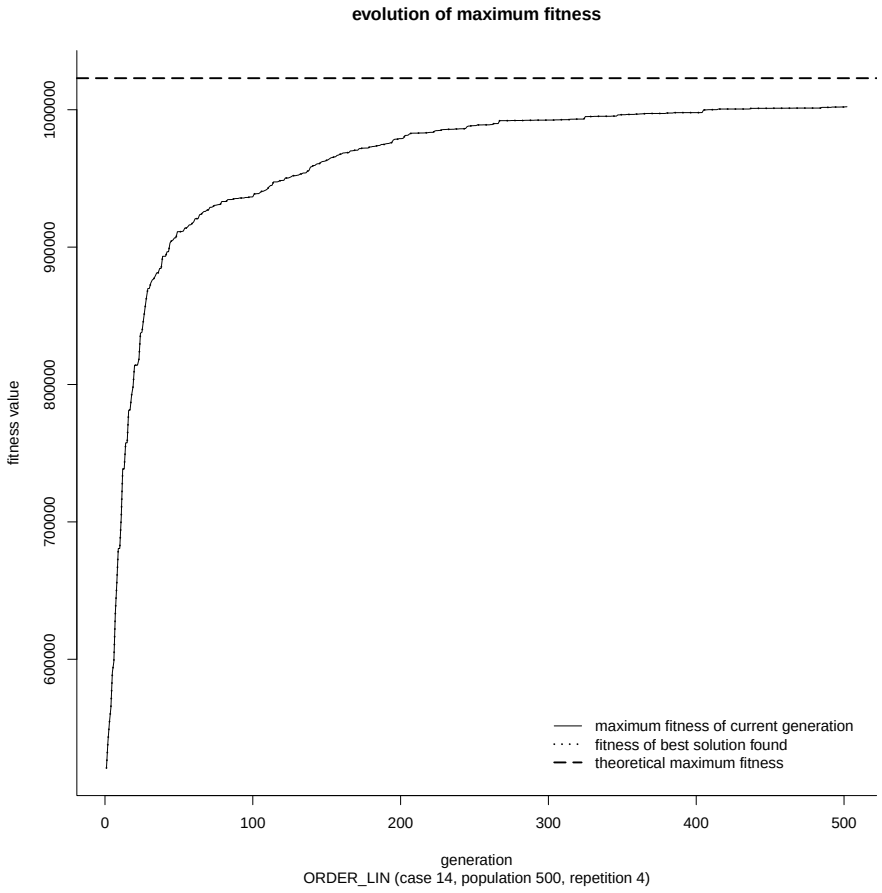

Fig. 18. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

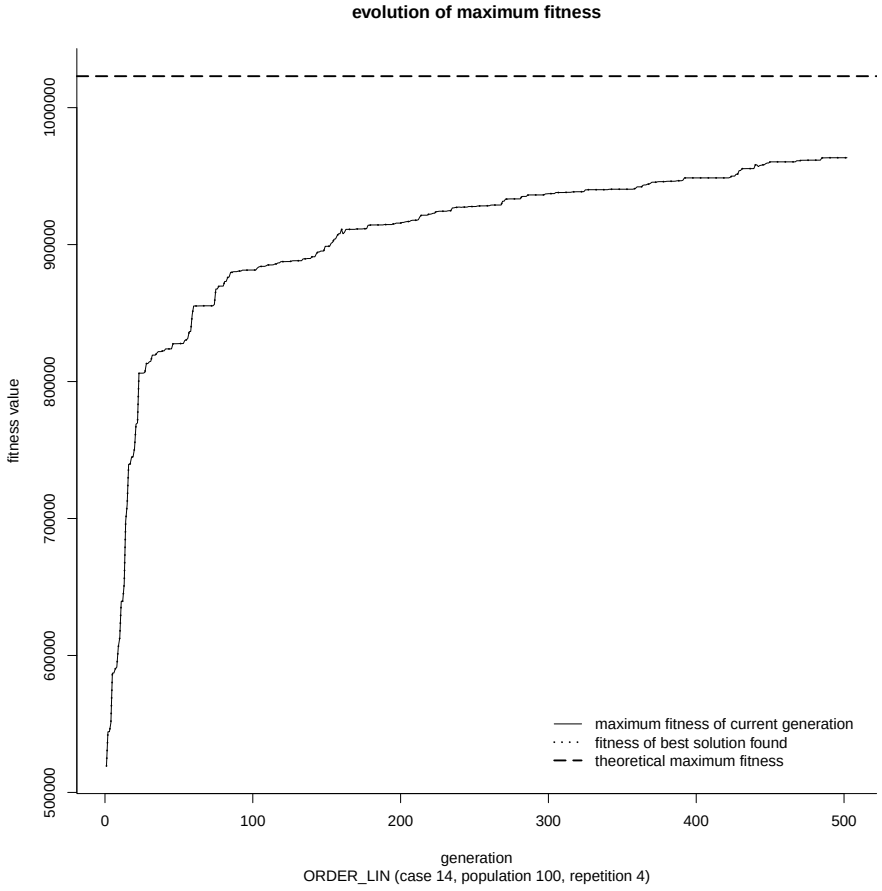

Fig. 19. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

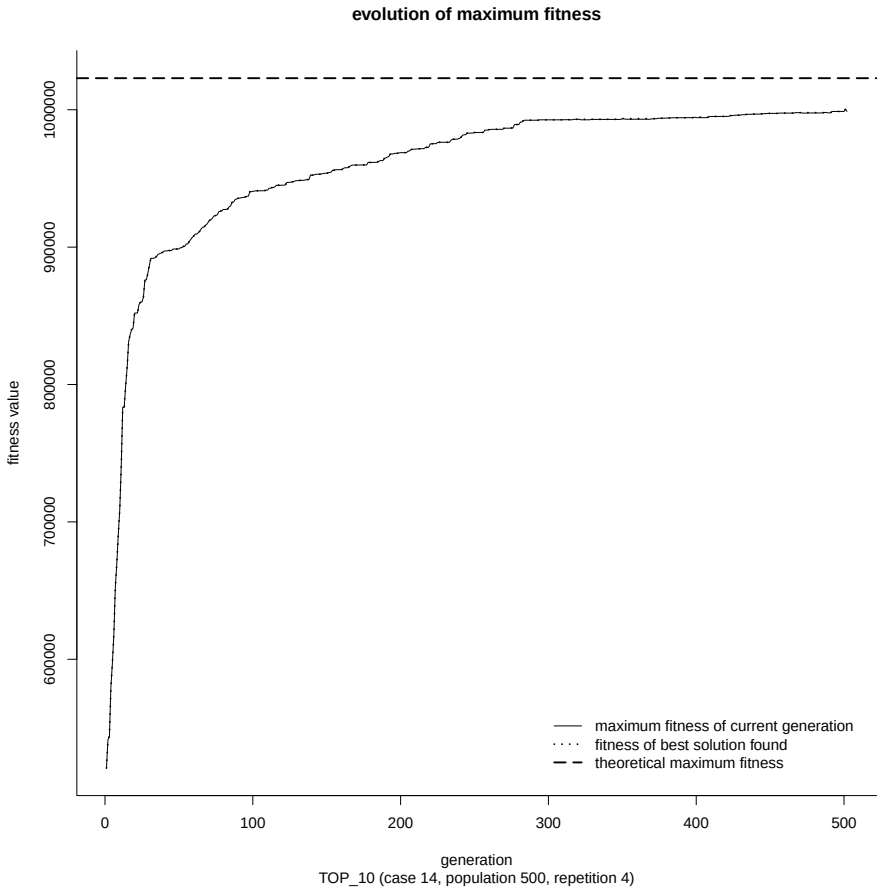

Fig. 20. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

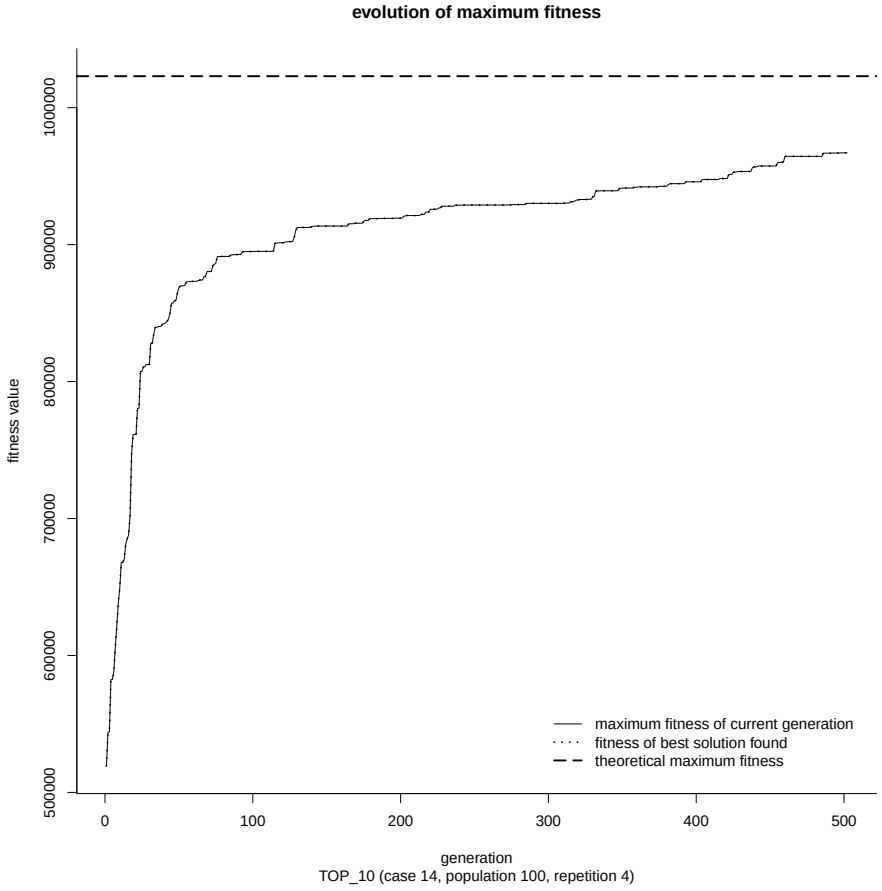

Fig. 21. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

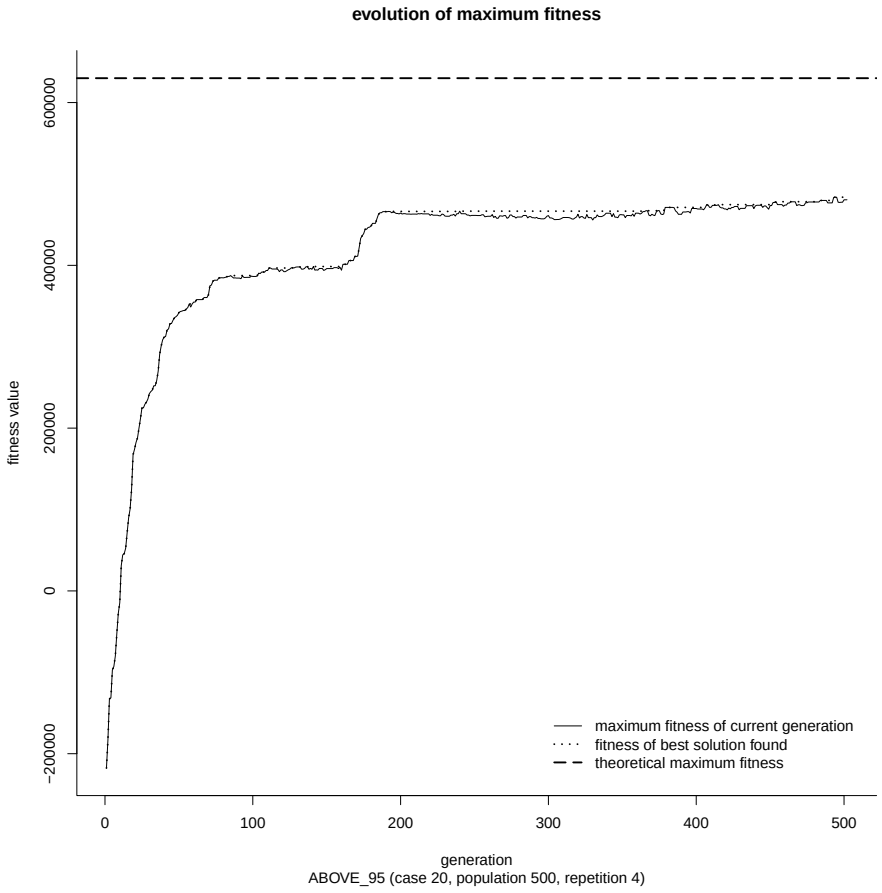

Fig. 22. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

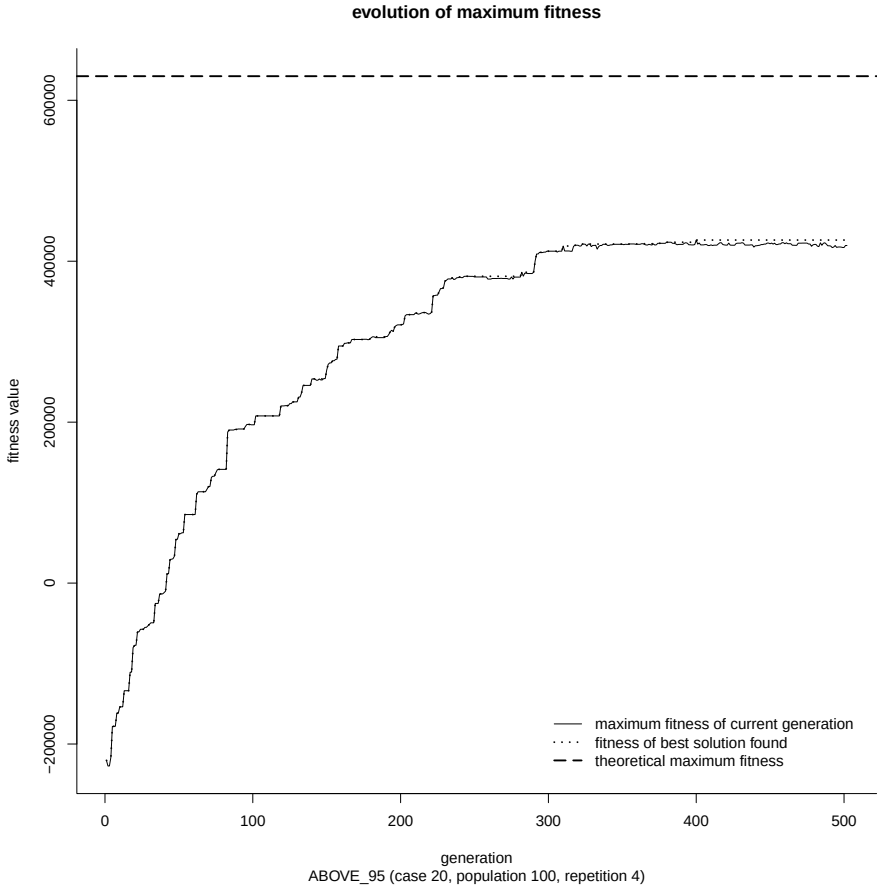

Fig. 23. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

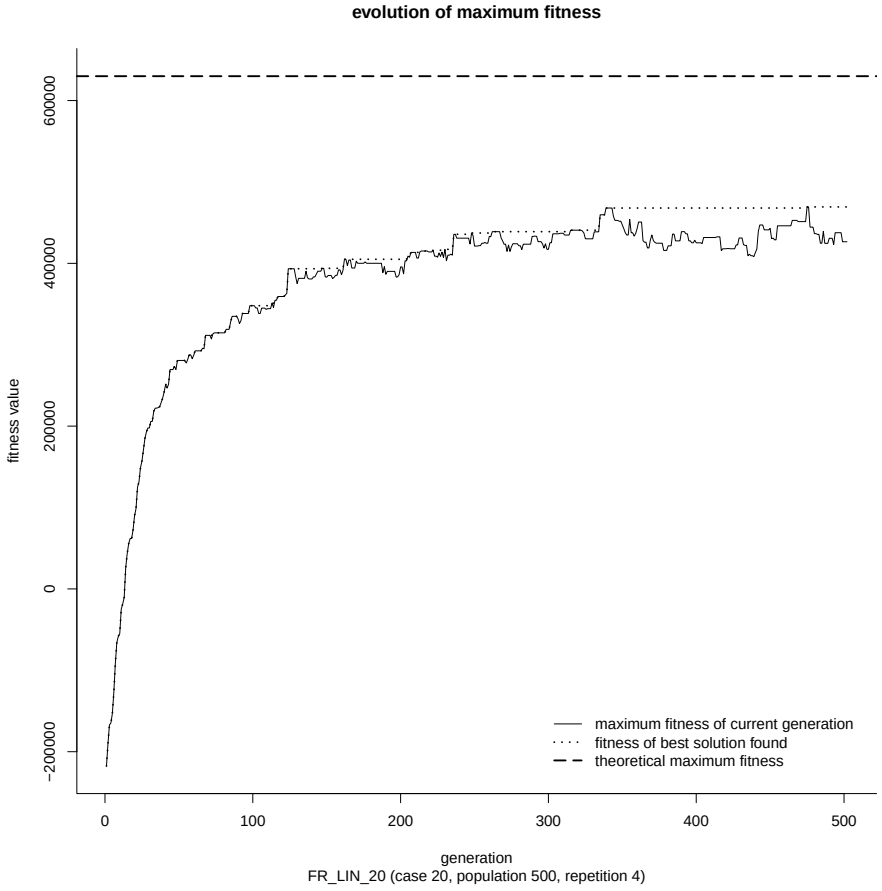

Fig. 24. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

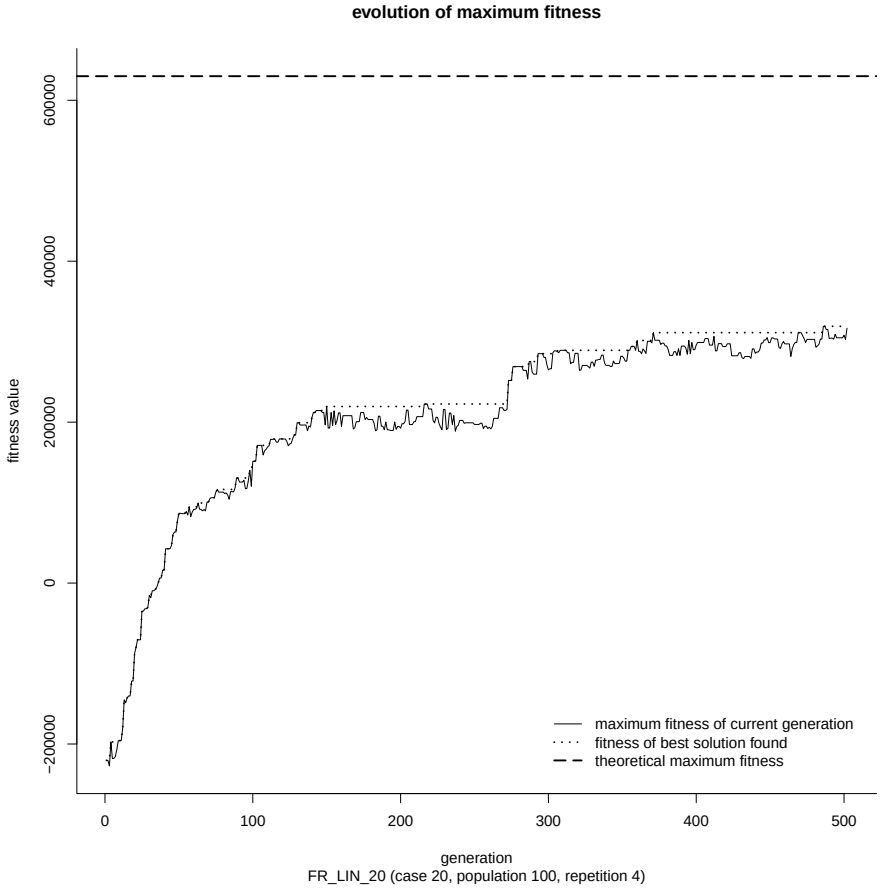

Fig. 25. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

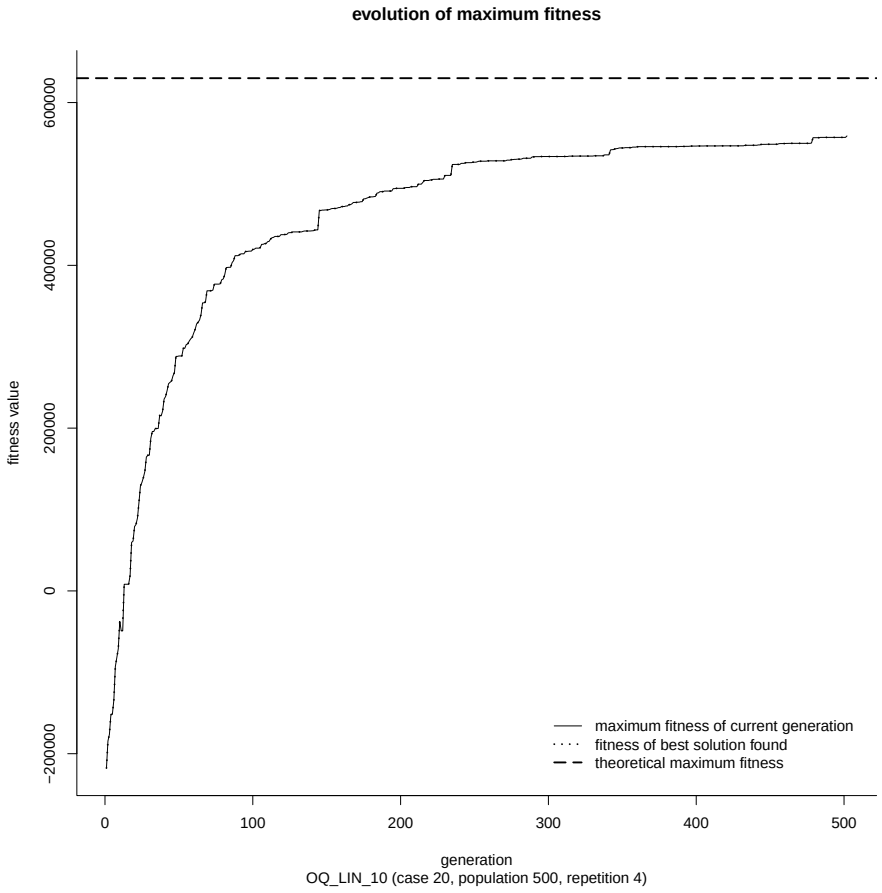

Fig. 26. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

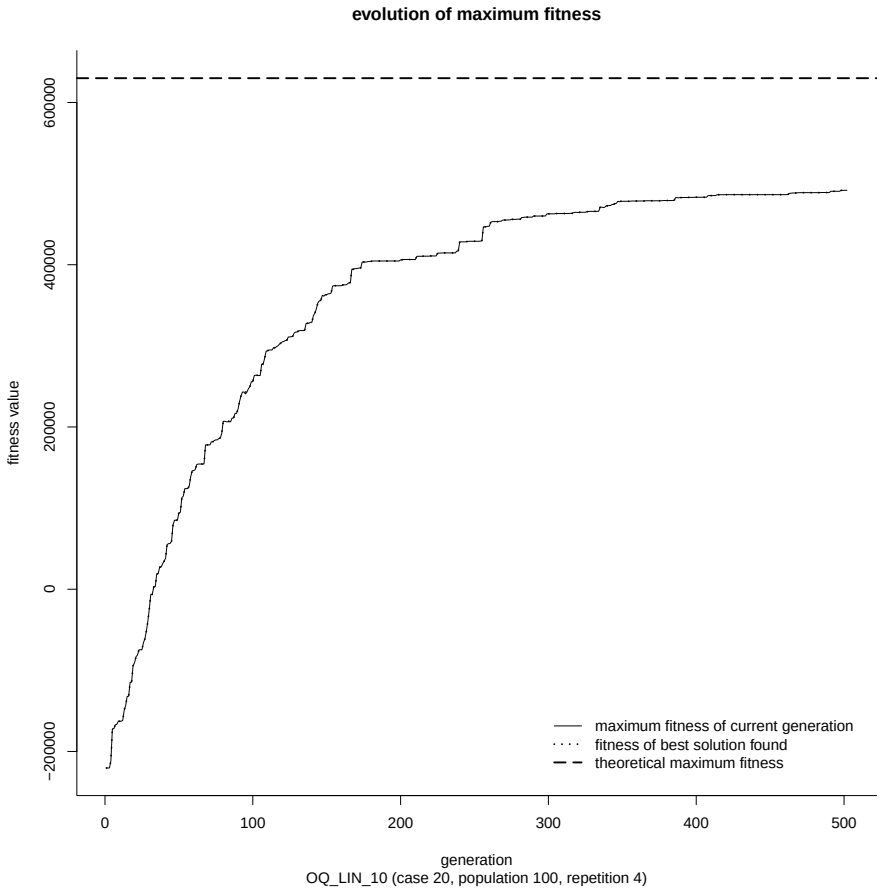

Fig. 27. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

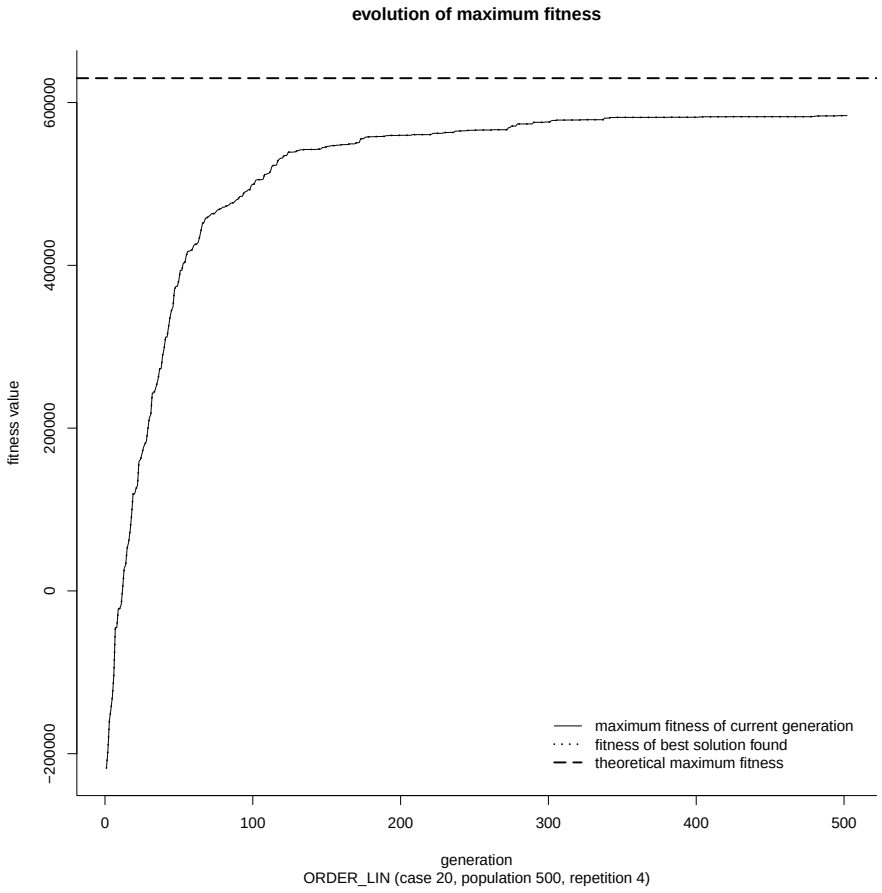

Fig. 28. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

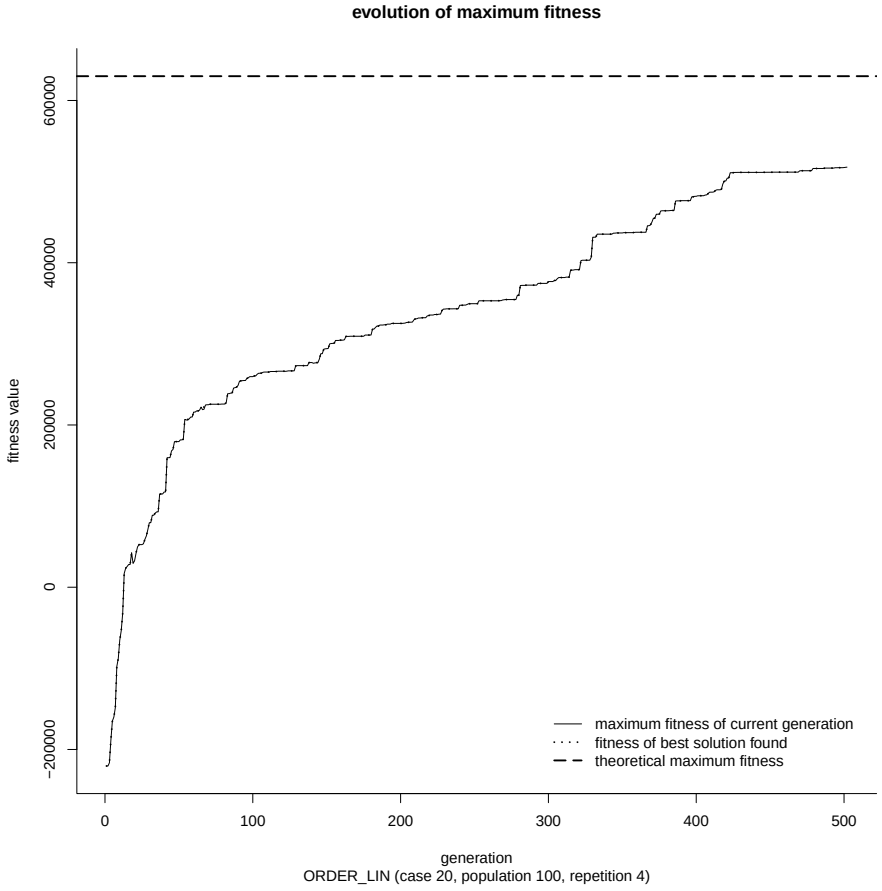

Fig. 29. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

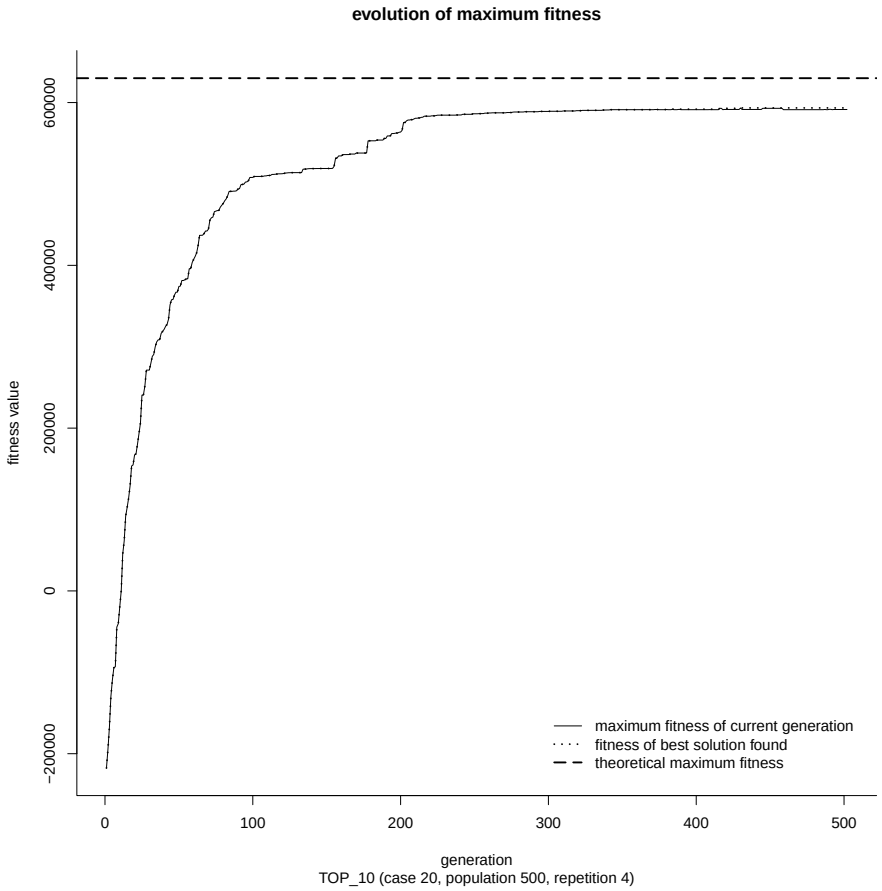

Fig. 30. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

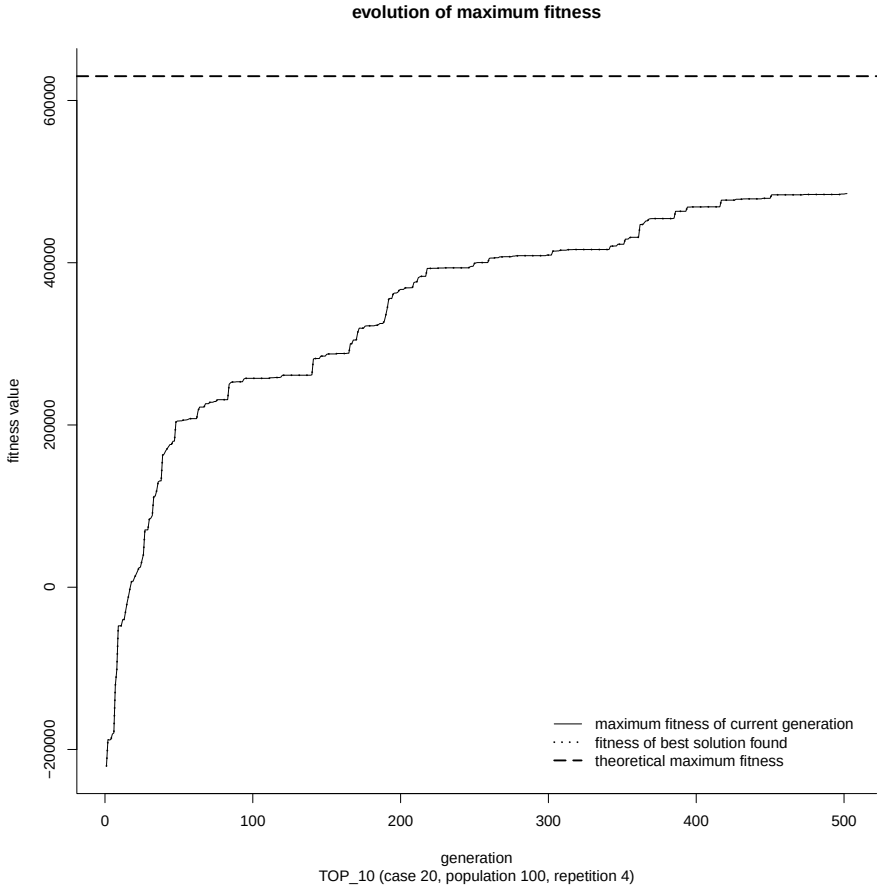

Fig. 31. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

2.3 Run 2

In contrast to the first run, the GA did not consider actual fitness values during the optimization in the second run. Rather, this information has been replaced in each iteration by a boolean value indicating if the fitness of the current best solution has been improved by an individual from this generation, with regards to all previous generations. The population size has then been used as a starting point by the GA to estimate and assign fitness values to the individuals of the generation, depending on the chosen fitness method. Configuration 0 with a population size of 500, as well as configuration 1 with a population size of 100, have been included in this experimental run. Although this run incorporated cases 1-47, the tables in this section only present the results for the cases 1-27, while the results for the remaining cases can be found in the next section (2.4).

Table 51. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_70						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.52%	*97.47%*	*97.56%*	97.40%	*97.37%*	*97.48%*
3	99.30%	*99.29%*	*99.32%*	99.29%	*99.29%*	*99.30%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.61%	*94.51%*	*94.64%*	94.26%	*94.24%*	*94.28%*
6	96.24%	*96.10%*	*96.37%*	96.12%	*96.09%*	*96.24%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.67%	*94.63%*	*94.74%*	94.48%	*94.48%*	*94.49%*
9	97.42%	*97.39%*	*97.45%*	97.38%	*97.37%*	*97.43%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	70.61%	*69.95%*	*71.49%*	69.98%	*69.83%*	*70.12%*
12	99.11%	*99.11%*	*99.11%*	99.11%	*99.10%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	68.53%	*66.91%*	*71.11%*	64.89%	*63.51%*	*68.60%*
15	96.91%	*96.90%*	*96.91%*	96.91%	*96.88%*	*96.99%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	62.09%	*60.83%*	*63.42%*	60.48%	*59.34%*	*61.29%*
18	96.25%	*96.24%*	*96.27%*	96.20%	*96.18%*	*96.22%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	54.28%	*53.59%*	*54.98%*	44.41%	*42.88%*	*47.47%*
21	54.83%	*51.81%*	*58.52%*	48.16%	*45.75%*	*51.55%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	62.06%	*59.65%*	*63.61%*	58.13%	*54.67%*	*63.93%*
24	59.59%	*55.64%*	*64.04%*	49.70%	*48.00%*	*51.99%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	61.56%	*57.40%*	*65.24%*	53.30%	*51.00%*	*55.29%*
27	55.31%	*53.56%*	*57.31%*	46.77%	*42.80%*	*51.88%*

Table 52. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_70													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	-	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	-	-	-	-	-	-	-	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 53. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_70		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	3.17	0.20
2	53.13	9.65
3	52.08	8.97
4	2.97	0.19
5	50.19	9.07
6	52.55	8.98
7	2.93	0.19
8	49.90	9.03
9	49.85	8.99
10	3.02	0.19
11	49.23	8.87
12	48.81	8.90
13	3.04	0.18
14	54.27	9.02
15	49.57	8.92
16	2.98	0.18
17	50.48	9.18
18	49.56	8.91
19	2.99	0.19
20	47.39	8.99
21	56.75	9.15
22	3.00	0.19
23	49.10	9.32
24	64.79	9.54
25	3.02	0.19
26	47.21	8.97
27	58.27	9.27

Table 54. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_80						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.53%	*97.51%*	*97.54%*	97.44%	*97.38%*	*97.55%*
3	99.31%	*99.31%*	*99.31%*	99.30%	*99.29%*	*99.31%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.66%	*94.51%*	*94.79%*	94.32%	*94.21%*	*94.61%*
6	96.25%	*96.18%*	*96.37%*	96.18%	*96.09%*	*96.28%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.66%	*94.64%*	*94.70%*	94.51%	*94.48%*	*94.53%*
9	97.45%	*97.39%*	*97.47%*	97.38%	*97.37%*	*97.42%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	73.61%	*71.70%*	*74.76%*	70.34%	*68.79%*	*71.52%*
12	99.12%	*99.11%*	*99.12%*	99.11%	*99.10%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	77.46%	*76.65%*	*79.22%*	74.72%	*70.80%*	*79.06%*
15	96.94%	*96.90%*	*97.02%*	96.88%	*96.86%*	*96.89%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	69.74%	*67.51%*	*71.36%*	67.89%	*65.35%*	*69.96%*
18	96.27%	*96.24%*	*96.37%*	96.21%	*96.19%*	*96.23%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	64.66%	*60.74%*	*71.91%*	52.23%	*49.68%*	*53.19%*
21	65.79%	*63.12%*	*67.26%*	54.52%	*49.08%*	*57.81%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	69.91%	*65.29%*	*73.18%*	68.92%	*66.12%*	*71.80%*
24	70.83%	*68.39%*	*73.70%*	61.67%	*60.29%*	*63.36%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	69.02%	*67.55%*	*69.61%*	63.25%	*61.11%*	*67.03%*
27	66.44%	*65.27%*	*67.19%*	59.29%	*55.28%*	*62.60%*

Table 55. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_80													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	-	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	132	-	-	-	-	-	188	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 56. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_80		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	3.04	0.19
2	49.32	8.93
3	48.95	8.88
4	3.03	0.19
5	50.44	8.96
6	50.02	8.99
7	3.02	0.19
8	51.59	9.41
9	52.01	8.97
10	2.99	0.19
11	49.69	9.06
12	50.43	9.06
13	3.01	0.19
14	57.42	9.08
15	51.62	8.94
16	3.00	0.19
17	53.61	8.94
18	49.99	8.86
19	3.02	0.19
20	47.72	8.95
21	62.12	9.10
22	3.01	0.19
23	47.51	8.94
24	65.78	9.23
25	3.02	0.19
26	47.47	9.41
27	64.58	9.74

Table 57. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_90						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.58%	*97.55%*	*97.66%*	97.46%	*97.42%*	*97.51%*
3	99.31%	*99.30%*	*99.31%*	99.30%	*99.29%*	*99.30%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.69%	*94.43%*	*95.02%*	94.31%	*94.20%*	*94.53%*
6	96.33%	*96.30%*	*96.38%*	96.23%	*96.10%*	*96.37%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.71%	*94.64%*	*94.79%*	94.60%	*94.53%*	*94.77%*
9	97.53%	*97.48%*	*97.59%*	97.43%	*97.37%*	*97.51%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	84.62%	*84.24%*	*84.96%*	76.88%	*75.01%*	*78.21%*
12	99.12%	*99.11%*	*99.14%*	99.12%	*99.10%*	*99.15%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	85.53%	*83.62%*	*87.07%*	82.17%	*80.61%*	*83.43%*
15	96.94%	*96.90%*	*96.96%*	96.91%	*96.86%*	*97.01%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	86.44%	*85.06%*	*88.98%*	80.02%	*76.73%*	*82.20%*
18	96.35%	*96.27%*	*96.44%*	96.22%	*96.18%*	*96.34%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	74.31%	*71.19%*	*76.59%*	60.91%	*57.39%*	*66.00%*
21	80.87%	*80.05%*	*82.14%*	65.89%	*61.72%*	*69.32%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	78.95%	*77.39%*	*80.37%*	72.69%	*68.07%*	*76.90%*
24	85.79%	*84.95%*	*86.82%*	78.57%	*76.44%*	*80.66%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	79.38%	*75.40%*	*81.39%*	68.55%	*65.76%*	*70.81%*
27	81.88%	*80.76%*	*83.98%*	65.32%	*62.83%*	*69.60%*

Table 58. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_90													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	6	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	58	123	-	-	-	-	256	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	25	40	125	-	-	-	88	170	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	68	120	382	-	-	-	191	303	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	460	-	-	-	-	-	-	-	-	-	-	-	
21	260	396	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	126	195	-	-	-	-	420	-	-	-	-	-	
24	89	131	260	-	-	-	319	480	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	302	384	-	-	-	-	-	-	-	-	-	-	
27	207	361	-	-	-	-	-	-	-	-	-	-	

Table 59. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_90		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	2.96	0.18
2	51.06	8.78
3	49.04	8.98
4	2.98	0.18
5	57.91	8.91
6	54.90	8.86
7	2.95	0.18
8	57.46	9.27
9	52.77	9.17
10	2.96	0.18
11	56.81	8.90
12	51.87	8.74
13	2.97	0.19
14	56.71	9.36
15	63.42	9.25
16	2.99	0.18
17	59.14	9.05
18	55.58	8.84
19	2.98	0.19
20	47.25	9.11
21	72.89	9.47
22	3.03	0.18
23	46.01	8.98
24	59.18	9.04
25	2.98	0.20
26	45.96	9.15
27	64.62	9.62

Table 60. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_95						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.68%	*97.64%*	*97.72%*	97.54%	*97.42%*	*97.67%*
3	99.33%	*99.31%*	*99.34%*	99.30%	*99.29%*	*99.31%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.82%	*94.43%*	*95.11%*	94.46%	*94.28%*	*94.83%*
6	96.38%	*96.27%*	*96.46%*	96.29%	*96.16%*	*96.46%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.96%	*94.84%*	*95.10%*	94.79%	*94.69%*	*94.99%*
9	97.53%	*97.49%*	*97.59%*	97.43%	*97.38%*	*97.47%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	88.13%	*87.20%*	*89.58%*	80.57%	*78.02%*	*83.69%*
12	99.14%	*99.13%*	*99.17%*	99.11%	*99.11%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	88.10%	*86.75%*	*89.04%*	84.17%	*81.99%*	*86.69%*
15	97.03%	*96.92%*	*97.17%*	96.89%	*96.86%*	*96.92%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	89.60%	*88.33%*	*90.95%*	82.09%	*80.16%*	*84.57%*
18	96.43%	*96.33%*	*96.54%*	96.23%	*96.20%*	*96.32%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	78.96%	*77.63%*	*80.39%*	66.63%	*61.69%*	*70.89%*
21	85.23%	*82.36%*	*88.67%*	71.58%	*66.61%*	*73.70%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	83.30%	*82.50%*	*83.88%*	76.26%	*71.72%*	*80.47%*
24	89.10%	*87.61%*	*90.80%*	77.07%	*75.15%*	*78.98%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	83.98%	*79.07%*	*87.27%*	72.38%	*66.91%*	*78.74%*
27	86.42%	*83.92%*	*89.50%*	70.98%	*66.79%*	*75.07%*

Table 61. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ABOVE_95													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	37	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	111	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	32	104	253	-	-	-	145	395	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	10	21	72	-	-	-	52	186	228	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	2	
17	31	60	175	423	-	-	127	328	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	264	469	-	-	-	-	-	-	-	-	-	-	
21	161	282	443	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	80	195	-	-	-	-	379	500	-	-	-	-	
24	77	122	207	272	-	-	382	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	2	
26	141	245	416	-	-	-	262	-	-	-	-	-	
27	172	259	369	-	-	-	476	-	-	-	-	-	

Table 62. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ABOVE_95		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	3.19	0.20
2	60.36	9.33
3	56.20	9.12
4	3.00	0.19
5	70.69	9.66
6	65.34	9.48
7	3.19	0.20
8	65.77	9.60
9	57.38	9.03
10	3.03	0.19
11	68.86	9.29
12	57.33	8.96
13	3.00	0.19
14	50.30	9.18
15	74.36	9.16
16	3.02	0.19
17	60.22	9.25
18	66.53	9.62
19	3.19	0.20
20	50.93	9.74
21	56.94	9.18
22	3.21	0.20
23	47.53	9.40
24	50.84	9.63
25	3.22	0.21
26	49.10	9.54
27	54.67	9.67

Table 63. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_5						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.50%	*97.42%*	*97.54%*	97.43%	*97.40%*	*97.46%*
3	99.30%	*99.30%*	*99.30%*	99.29%	*99.29%*	*99.30%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.63%	*94.43%*	*94.90%*	94.40%	*94.28%*	*94.62%*
6	96.23%	*96.16%*	*96.32%*	96.13%	*96.07%*	*96.28%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.66%	*94.53%*	*94.72%*	94.51%	*94.48%*	*94.54%*
9	97.43%	*97.39%*	*97.48%*	97.40%	*97.37%*	*97.50%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	71.35%	*70.44%*	*72.27%*	70.49%	*69.95%*	*71.24%*
12	99.11%	*99.11%*	*99.11%*	99.11%	*99.10%*	*99.11%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	65.21%	*63.21%*	*67.74%*	60.29%	*57.34%*	*65.16%*
15	96.90%	*96.89%*	*96.90%*	96.88%	*96.86%*	*96.89%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	61.73%	*60.25%*	*62.85%*	59.76%	*58.35%*	*62.89%*
18	96.25%	*96.23%*	*96.30%*	96.20%	*96.19%*	*96.21%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	24.18%	*19.66%*	*36.27%*	6.63%	*3.58%*	*9.30%*
21	40.20%	*39.03%*	*41.57%*	38.13%	*37.29%*	*41.47%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	41.68%	*38.37%*	*50.68%*	32.23%	*28.15%*	*39.13%*
24	36.23%	*33.67%*	*37.75%*	30.30%	*28.54%*	*32.24%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	28.23%	*25.38%*	*31.78%*	16.82%	*13.41%*	*19.14%*
27	36.69%	*33.57%*	*46.03%*	31.77%	*30.88%*	*32.45%*

Table 64. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_5													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	-	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	-	-	-	-	-	-	-	-	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	-	-	-	-	-	-	-	-	-	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	-	-	-	-	-	-	-	-	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	-	-	-	-	-	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	-	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	

Table 65. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_5		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.50	0.10
2	63.14	12.20
3	62.53	12.35
4	0.49	0.10
5	63.01	12.42
6	64.05	12.50
7	0.50	0.10
8	62.38	12.14
9	62.21	11.84
10	0.47	0.09
11	59.78	11.82
12	59.97	11.89
13	0.50	0.10
14	63.39	12.55
15	62.10	12.50
16	0.50	0.10
17	61.88	11.86
18	59.48	11.84
19	0.46	0.09
20	60.38	11.92
21	59.48	11.90
22	0.46	0.09
23	60.43	11.97
24	60.63	11.85
25	0.47	0.09
26	61.63	12.15
27	60.03	11.81

Table 66. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_7						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.56%	*97.54%*	*97.59%*	97.44%	*97.40%*	*97.49%*
3	99.31%	*99.30%*	*99.31%*	99.29%	*99.29%*	*99.29%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.46%	*94.43%*	*94.52%*	94.31%	*94.28%*	*94.43%*
6	96.29%	*96.17%*	*96.44%*	96.13%	*96.09%*	*96.23%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.75%	*94.64%*	*94.95%*	94.62%	*94.54%*	*94.66%*
9	97.45%	*97.39%*	*97.52%*	97.43%	*97.37%*	*97.48%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	75.12%	*71.86%*	*76.99%*	70.53%	*69.95%*	*71.15%*
12	99.12%	*99.12%*	*99.13%*	99.11%	*99.10%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	76.03%	*72.42%*	*78.90%*	72.50%	*69.42%*	*74.66%*
15	96.93%	*96.90%*	*96.97%*	96.88%	*96.86%*	*96.89%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	68.32%	*65.69%*	*70.43%*	68.51%	*63.79%*	*72.40%*
18	96.25%	*96.23%*	*96.28%*	96.22%	*96.18%*	*96.29%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	35.93%	*30.28%*	*38.99%*	25.98%	*20.12%*	*31.95%*
21	44.42%	*40.50%*	*48.82%*	41.40%	*39.97%*	*43.89%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	56.66%	*55.57%*	*57.98%*	48.57%	*42.19%*	*54.11%*
24	54.25%	*52.82%*	*55.45%*	43.44%	*40.27%*	*49.23%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	46.23%	*41.55%*	*53.15%*	37.54%	*29.07%*	*43.47%*
27	51.66%	*47.39%*	*54.30%*	41.53%	*37.64%*	*49.80%*

Table 67. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_7													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	-	-	1	1	1	1	-	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	-	-	1	1	1	1	-	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	339	-	-	-	-	-	-	-	-	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	159	-	-	-	-	-	-	-	-	-	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	-	-	-	-	-	-	-	-	-	-	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-

Table 68. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_7		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.47	0.09
2	59.76	11.75
3	59.16	11.71
4	0.47	0.09
5	61.34	12.38
6	60.08	11.81
7	0.47	0.10
8	62.60	11.78
9	59.45	11.75
10	0.47	0.09
11	59.24	11.90
12	59.43	11.72
13	0.47	0.09
14	60.32	11.89
15	60.06	11.86
16	0.50	0.10
17	62.30	11.87
18	59.16	11.76
19	0.47	0.09
20	62.23	12.56
21	60.41	11.81
22	0.47	0.09
23	59.88	11.96
24	60.66	11.97
25	0.47	0.10
26	60.06	11.90
27	60.00	11.81

Table 69. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.58%	*97.56%*	*97.60%*	97.46%	*97.41%*	*97.49%*
3	99.31%	*99.29%*	*99.33%*	99.30%	*99.29%*	*99.33%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.72%	*94.67%*	*94.79%*	94.41%	*94.28%*	*94.53%*
6	96.32%	*96.20%*	*96.45%*	96.23%	*96.17%*	*96.29%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.78%	*94.64%*	*94.83%*	94.70%	*94.64%*	*94.74%*
9	97.48%	*97.45%*	*97.51%*	97.42%	*97.38%*	*97.47%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	79.21%	*78.03%*	*81.17%*	73.92%	*69.99%*	*78.55%*
12	99.13%	*99.11%*	*99.16%*	99.11%	*99.10%*	*99.12%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	82.87%	*81.32%*	*84.26%*	81.08%	*79.91%*	*82.67%*
15	96.94%	*96.90%*	*97.01%*	96.88%	*96.86%*	*96.90%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	79.09%	*77.77%*	*80.81%*	76.79%	*73.94%*	*79.76%*
18	96.36%	*96.28%*	*96.42%*	96.26%	*96.20%*	*96.33%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	46.81%	*44.68%*	*47.74%*	37.54%	*35.34%*	*43.16%*
21	57.27%	*54.09%*	*59.57%*	44.97%	*41.83%*	*47.12%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	66.94%	*64.17%*	*70.91%*	64.34%	*60.65%*	*68.55%*
24	71.89%	*68.58%*	*76.39%*	61.97%	*58.64%*	*68.81%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	61.43%	*57.24%*	*65.30%*	57.04%	*48.13%*	*61.21%*
27	65.81%	*62.59%*	*68.68%*	56.39%	*53.95%*	*58.25%*

Table 70. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_10													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	-	-	1	1	1	1	-	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	-	-	1	1	1	1	-	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	141	458	-	-	-	-	422	-	-	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	30	50	-	-	-	-	120	165	-	-	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	174	451	-	-	-	-	357	-	-	-	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	-	-	-	-	-	-	-	-	-	-	-	-
24	246	-	-	-	-	-	-	-	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-

Table 71. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_10		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.46	0.09
2	58.75	11.57
3	58.15	11.51
4	0.48	0.09
5	59.13	11.65
6	59.55	11.64
7	0.49	0.09
8	59.29	11.58
9	58.64	11.59
10	0.49	0.09
11	58.74	11.69
12	58.76	11.71
13	0.47	0.09
14	60.27	11.92
15	59.38	11.67
16	0.47	0.09
17	60.07	11.82
18	61.90	12.18
19	0.50	0.09
20	59.01	11.72
21	58.97	11.64
22	0.46	0.10
23	59.33	11.88
24	60.42	11.84
25	0.47	0.09
26	59.29	11.88
27	59.88	11.79

Table 72. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_20						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	97.65%	*97.57%*	*97.73%*	97.49%	*97.46%*	*97.56%*
3	99.34%	*99.31%*	*99.36%*	99.31%	*99.29%*	*99.34%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	94.83%	*94.76%*	*94.91%*	94.47%	*94.31%*	*94.63%*
6	96.42%	*96.30%*	*96.57%*	96.25%	*96.15%*	*96.40%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	94.95%	*94.92%*	*95.00%*	94.80%	*94.65%*	*95.03%*
9	97.60%	*97.55%*	*97.66%*	97.50%	*97.39%*	*97.63%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	89.91%	*88.50%*	*92.65%*	81.56%	*80.46%*	*83.16%*
12	99.15%	*99.13%*	*99.21%*	99.12%	*99.11%*	*99.15%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	87.17%	*84.92%*	*91.04%*	84.57%	*82.42%*	*86.68%*
15	97.02%	*96.94%*	*97.08%*	96.88%	*96.86%*	*96.92%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	88.78%	*87.01%*	*89.56%*	82.61%	*80.26%*	*84.09%*
18	96.45%	*96.38%*	*96.57%*	96.31%	*96.22%*	*96.39%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	69.15%	*68.55%*	*70.76%*	52.28%	*44.05%*	*59.84%*
21	78.84%	*73.55%*	*82.04%*	64.95%	*60.49%*	*69.51%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	77.60%	*72.79%*	*81.32%*	74.52%	*72.08%*	*77.64%*
24	87.18%	*85.59%*	*88.58%*	77.89%	*75.11%*	*80.99%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	77.33%	*75.63%*	*79.66%*	69.34%	*64.98%*	*77.26%*
27	83.65%	*82.45%*	*85.48%*	68.85%	*64.99%*	*70.80%*

Table 73. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

FR_LIN_20													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	-	-	1	1	1	1	-	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	-	-	1	1	1	1	65	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	52	91	188	222	-	-	113	324	-	-	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	2	
14	16	21	96	354	-	-	46	65	246	-	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	39	76	153	-	-	-	153	313	-	-	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	-	-	-	-	-	-	-	-	-	-	-	-	
21	272	347	-	-	-	-	-	-	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	128	376	-	-	-	-	326	-	-	-	-	-	
24	114	158	289	-	-	-	445	482	-	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	308	-	-	-	-	-	447	-	-	-	-	-	
27	217	333	424	-	-	-	-	-	-	-	-	-	

Table 74. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

FR_LIN_20		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.56	0.11
2	59.74	11.62
3	59.47	11.76
4	0.48	0.10
5	59.67	11.70
6	60.71	11.62
7	0.47	0.10
8	60.72	11.65
9	59.67	11.74
10	0.49	0.10
11	59.22	11.74
12	57.80	11.57
13	0.47	0.10
14	58.77	11.94
15	58.68	11.51
16	0.47	0.09
17	59.39	11.79
18	61.50	12.05
19	0.50	0.10
20	62.59	12.40
21	61.34	12.33
22	0.47	0.09
23	59.08	12.02
24	59.88	12.33
25	0.50	0.10
26	62.80	12.46
27	59.77	11.86

Table 75. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_5						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.69%	*99.64%*	*99.71%*	98.90%	*98.83%*	*98.96%*
3	99.88%	*99.83%*	*99.92%*	99.58%	*99.56%*	*99.60%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.78%	*98.53%*	*99.15%*	97.08%	*96.74%*	*97.47%*
6	99.36%	*99.18%*	*99.60%*	98.12%	*97.74%*	*98.43%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.17%	*98.99%*	*99.40%*	97.51%	*97.32%*	*97.67%*
9	99.56%	*99.49%*	*99.60%*	98.58%	*98.40%*	*98.82%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.61%	*96.16%*	*96.95%*	88.52%	*86.90%*	*91.30%*
12	99.78%	*99.74%*	*99.81%*	99.40%	*99.36%*	*99.47%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.53%	*97.12%*	*97.89%*	93.31%	*91.76%*	*94.08%*
15	98.27%	*98.13%*	*98.38%*	97.21%	*97.05%*	*97.38%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.89%	*96.37%*	*97.34%*	91.02%	*89.38%*	*92.07%*
18	98.76%	*98.50%*	*98.95%*	97.31%	*96.97%*	*97.82%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	92.95%	*90.99%*	*94.35%*	74.70%	*68.89%*	*81.05%*
21	94.54%	*92.89%*	*95.93%*	81.65%	*77.99%*	*83.47%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	95.11%	*93.78%*	*95.96%*	84.64%	*80.76%*	*87.66%*
24	95.48%	*94.59%*	*97.32%*	85.32%	*84.43%*	*85.76%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	94.27%	*93.68%*	*95.24%*	83.03%	*81.04%*	*84.08%*
27	94.98%	*94.01%*	*95.57%*	81.87%	*78.52%*	*86.61%*

Table 76. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_5													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	19	-	1	1	1	1	73	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	12	-	1	1	1	1	41	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	16	35	60	115	326	-	53	121	329	478	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	17	26	43	82	223	-	31	47	86	209	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	28	42	65	119	321	-	70	119	199	389	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	157	195	254	380	-	-	427	447	-	-	-	-	
21	82	113	164	245	459	-	346	447	-	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	1	
23	148	181	222	321	442	-	267	348	433	-	-	-	
24	67	81	116	183	420	-	218	314	463	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	136	166	220	318	473	-	265	385	-	-	-	-	
27	91	119	171	253	448	-	316	398	428	-	-	-	

Table 77. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_5		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.38	0.08
2	49.65	9.49
3	48.30	9.17
4	0.38	0.08
5	50.85	9.71
6	51.16	9.86
7	0.41	0.08
8	51.70	9.49
9	51.03	9.81
10	0.41	0.08
11	51.40	9.49
12	47.32	9.14
13	0.41	0.08
14	51.80	9.81
15	48.07	9.12
16	0.38	0.08
17	49.48	9.62
18	50.97	9.64
19	0.40	0.08
20	50.73	9.62
21	49.25	9.45
22	0.39	0.08
23	48.95	9.56
24	48.36	9.45
25	0.38	0.08
26	48.62	9.78
27	51.68	9.71

Table 78. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_7						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.78%	*99.72%*	*99.85%*	99.01%	*98.96%*	*99.09%*
3	99.93%	*99.91%*	*99.94%*	99.56%	*99.45%*	*99.66%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.70%	*98.51%*	*99.02%*	97.07%	*96.62%*	*97.31%*
6	99.39%	*99.11%*	*99.60%*	98.26%	*98.08%*	*98.55%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.35%	*99.23%*	*99.43%*	97.56%	*97.32%*	*97.80%*
9	99.68%	*99.58%*	*99.76%*	98.84%	*98.71%*	*99.09%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.80%	*94.88%*	*96.63%*	90.08%	*88.13%*	*91.53%*
12	99.80%	*99.66%*	*99.89%*	99.41%	*99.36%*	*99.48%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.80%	*97.52%*	*98.10%*	94.11%	*93.43%*	*94.66%*
15	98.27%	*97.94%*	*98.54%*	97.42%	*97.27%*	*97.57%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.80%	*96.14%*	*97.64%*	90.79%	*89.66%*	*92.19%*
18	98.84%	*98.57%*	*99.05%*	97.54%	*97.25%*	*97.82%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	91.61%	*88.91%*	*95.70%*	77.04%	*74.41%*	*81.96%*
21	95.47%	*92.74%*	*96.97%*	82.84%	*80.93%*	*85.85%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	96.51%	*95.79%*	*97.29%*	88.33%	*85.52%*	*91.61%*
24	95.60%	*94.90%*	*96.46%*	86.24%	*81.88%*	*89.43%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	94.56%	*93.21%*	*95.63%*	83.43%	*80.15%*	*87.38%*
27	95.70%	*94.12%*	*96.88%*	84.65%	*82.25%*	*86.00%*

Table 79. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_7													
	population 500						**population 100**						
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	
1	1	1	1	1	1	1	1	1	1	1	1	1	
2	1	1	1	1	1	-	1	1	1	1	1	-	
3	1	1	1	1	1	-	1	1	1	1	1	-	
4	1	1	1	1	1	1	1	1	1	1	1	1	
5	1	1	1	1	12	-	1	1	1	1	77	-	
6	1	1	1	1	1	-	1	1	1	1	1	-	
7	1	1	1	1	1	1	1	1	1	1	1	1	
8	1	1	1	1	14	-	1	1	1	1	45	-	
9	1	1	1	1	1	-	1	1	1	1	1	-	
10	1	1	1	1	1	1	1	1	1	1	1	1	
11	13	30	49	117	276	-	31	83	213	375	-	-	
12	1	1	1	1	1	-	1	1	1	1	1	-	
13	1	1	1	1	1	1	1	1	1	1	1	1	
14	17	21	36	72	191	-	29	41	92	224	-	-	
15	1	1	1	1	1	-	1	1	1	1	1	-	
16	1	1	1	1	1	1	1	1	1	1	1	1	
17	24	36	55	108	292	-	58	98	200	422	-	-	
18	1	1	1	1	1	-	1	1	1	1	1	-	
19	1	1	1	1	1	1	1	1	1	1	1	1	
20	150	183	255	390	431	-	420	430	-	-	-	-	
21	83	114	162	269	398	-	259	379	441	-	-	-	
22	1	1	1	1	1	1	1	1	1	1	1	2	
23	104	120	153	213	377	-	178	261	382	450	-	-	
24	66	92	125	192	449	-	215	290	401	-	-	-	
25	1	1	1	1	1	1	1	1	1	1	1	1	
26	111	143	182	291	481	-	258	396	360	-	-	-	
27	87	121	180	247	416	-	250	340	487	-	-	-	

Table 80. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_7		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.38	0.08
2	49.82	9.86
3	51.08	9.24
4	0.39	0.08
5	49.05	9.59
6	51.67	9.78
7	0.41	0.08
8	51.99	10.08
9	52.40	9.85
10	0.41	0.08
11	50.73	10.07
12	50.19	9.23
13	0.38	0.08
14	49.97	9.82
15	48.03	9.18
16	0.38	0.08
17	49.83	9.71
18	48.16	9.17
19	0.38	0.08
20	49.47	9.73
21	49.53	9.50
22	0.38	0.08
23	49.17	9.90
24	49.26	9.54
25	0.38	0.08
26	49.51	9.75
27	49.41	9.60

Table 81. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.78%	*99.71%*	*99.88%*	98.98%	*98.89%*	*99.06%*
3	99.89%	*99.87%*	*99.94%*	99.59%	*99.52%*	*99.64%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.77%	*98.52%*	*98.96%*	97.41%	*97.07%*	*97.64%*
6	99.46%	*99.37%*	*99.52%*	98.27%	*98.15%*	*98.43%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.32%	*99.16%*	*99.42%*	97.73%	*97.63%*	*97.88%*
9	99.64%	*99.60%*	*99.70%*	98.83%	*98.71%*	*98.90%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.32%	*95.54%*	*97.32%*	90.45%	*88.62%*	*92.40%*
12	99.82%	*99.78%*	*99.86%*	99.36%	*99.28%*	*99.43%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.74%	*97.39%*	*98.61%*	93.67%	*93.00%*	*94.11%*
15	98.30%	*98.12%*	*98.36%*	97.46%	*97.32%*	*97.60%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	97.27%	*97.07%*	*97.44%*	92.17%	*90.39%*	*93.29%*
18	99.05%	*99.00%*	*99.15%*	97.64%	*97.37%*	*98.00%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	92.25%	*90.91%*	*93.22%*	76.80%	*74.04%*	*82.52%*
21	95.44%	*93.77%*	*97.08%*	81.11%	*79.28%*	*82.46%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	96.44%	*95.03%*	*97.71%*	86.19%	*83.32%*	*90.93%*
24	96.21%	*95.49%*	*97.34%*	85.85%	*81.25%*	*88.83%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	95.67%	*94.17%*	*96.47%*	83.12%	*80.06%*	*86.17%*
27	95.73%	*94.72%*	*96.70%*	84.55%	*79.97%*	*89.89%*

Table 82. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

OQ_LIN_10												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	15	-	1	1	1	1	51	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	11	-	1	1	1	1	46	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	12	25	52	115	335	-	37	98	205	346	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	15	20	30	71	214	-	33	48	91	232	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	26	37	56	115	240	-	50	98	153	326	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	121	154	211	341	-	-	440	455	-	-	-	-
21	71	101	144	238	412	-	276	394	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	2
23	78	99	144	205	402	-	219	294	324	424	-	-
24	55	76	112	182	367	-	214	291	415	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	94	122	168	244	408	-	314	431	483	-	-	-
27	99	133	174	266	417	-	274	362	345	-	-	-

Table 83. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

OQ_LIN_10		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.39	0.08
2	49.33	9.85
3	47.42	9.15
4	0.38	0.08
5	49.10	9.43
6	48.99	9.31
7	0.38	0.08
8	49.05	9.48
9	48.06	9.30
10	0.38	0.08
11	48.83	9.53
12	47.84	9.01
13	0.38	0.09
14	51.67	10.28
15	49.91	9.50
16	0.40	0.08
17	50.99	9.62
18	47.37	9.10
19	0.38	0.08
20	49.68	9.72
21	48.97	9.52
22	0.38	0.08
23	49.53	9.72
24	49.10	9.50
25	0.38	0.08
26	49.42	9.65
27	49.10	9.54

Table 84. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LIN						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.76%	*99.69%*	*99.86%*	99.01%	*98.88%*	*99.07%*
3	99.93%	*99.86%*	*99.97%*	99.63%	*99.59%*	*99.69%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.96%	*98.77%*	*99.41%*	97.37%	*97.18%*	*97.76%*
6	99.33%	*99.17%*	*99.53%*	98.19%	*98.00%*	*98.45%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.36%	*99.17%*	*99.51%*	97.71%	*97.63%*	*97.77%*
9	99.69%	*99.60%*	*99.74%*	98.90%	*98.68%*	*99.08%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	96.35%	*95.73%*	*97.15%*	89.78%	*88.49%*	*90.70%*
12	99.84%	*99.82%*	*99.87%*	99.45%	*99.38%*	*99.56%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.99%	*97.26%*	*98.71%*	94.16%	*93.79%*	*94.53%*
15	98.36%	*98.12%*	*98.68%*	97.43%	*97.26%*	*97.56%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	97.41%	*96.70%*	*97.91%*	91.96%	*90.71%*	*92.69%*
18	99.04%	*98.87%*	*99.16%*	97.66%	*97.39%*	*97.80%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	92.50%	*88.59%*	*94.23%*	78.97%	*77.53%*	*80.30%*
21	95.08%	*93.69%*	*96.48%*	84.87%	*80.48%*	*87.69%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	97.32%	*96.26%*	*98.26%*	87.47%	*85.29%*	*89.61%*
24	95.67%	*93.75%*	*97.32%*	87.47%	*85.29%*	*89.56%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	95.72%	*94.70%*	*96.74%*	83.74%	*81.34%*	*86.12%*
27	94.69%	*94.12%*	*95.91%*	82.89%	*77.90%*	*86.55%*

Table 85. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LIN												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	10	-	1	1	1	1	42	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	9	-	1	1	1	1	32	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	12	29	52	110	319	-	31	74	155	445	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	2
14	14	19	27	63	184	-	30	45	83	203	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	21	32	55	111	253	-	44	93	192	346	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	126	159	241	306	-	-	384	457	-	-	-	-
21	72	103	149	260	365	-	275	386	437	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	72	87	117	166	318	-	164	240	392	-	-	-
24	53	77	111	180	392	-	158	261	390	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	81	104	151	230	408	-	271	356	402	-	-	-
27	86	114	169	272	458	-	288	335	409	-	-	-

Table 86. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ORDER_LIN		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.39	0.08
2	49.74	9.61
3	51.04	9.48
4	0.39	0.08
5	51.93	9.90
6	52.27	9.85
7	0.41	0.08
8	50.39	9.74
9	50.53	9.94
10	0.41	0.08
11	51.77	9.57
12	47.69	9.10
13	0.38	0.08
14	51.40	10.23
15	50.97	9.50
16	0.41	0.08
17	53.69	9.72
18	47.52	9.17
19	0.38	0.08
20	49.70	9.78
21	50.66	9.69
22	0.41	0.08
23	53.37	9.99
24	49.74	10.16
25	0.41	0.08
26	53.05	10.11
27	51.07	9.54

Table 87. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LOG						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.77%	*99.65%*	*99.86%*	99.00%	*98.81%*	*99.09%*
3	99.93%	*99.89%*	*99.97%*	99.65%	*99.60%*	*99.68%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.90%	*98.45%*	*99.29%*	97.28%	*96.97%*	*97.58%*
6	99.41%	*99.22%*	*99.66%*	98.27%	*97.85%*	*98.75%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.34%	*99.14%*	*99.49%*	97.60%	*97.34%*	*97.84%*
9	99.71%	*99.60%*	*99.84%*	98.97%	*98.86%*	*99.09%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.71%	*94.53%*	*96.89%*	89.50%	*88.09%*	*90.07%*
12	99.80%	*99.77%*	*99.82%*	99.38%	*99.30%*	*99.42%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.75%	*97.31%*	*98.16%*	94.06%	*92.92%*	*95.69%*
15	98.60%	*98.22%*	*98.88%*	97.43%	*97.19%*	*97.80%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	97.23%	*96.51%*	*98.27%*	92.36%	*90.67%*	*93.83%*
18	99.12%	*98.99%*	*99.31%*	97.61%	*97.41%*	*97.82%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	93.12%	*90.00%*	*96.25%*	81.73%	*79.69%*	*83.14%*
21	94.97%	*93.58%*	*96.70%*	83.86%	*80.25%*	*88.03%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	97.18%	*96.86%*	*97.80%*	87.54%	*84.75%*	*89.01%*
24	96.44%	*95.49%*	*97.19%*	84.69%	*81.91%*	*87.10%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	95.89%	*94.51%*	*96.86%*	85.40%	*84.11%*	*86.40%*
27	95.36%	*93.66%*	*96.06%*	84.42%	*82.44%*	*86.63%*

Table 88. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

ORDER_LOG												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	11	-	1	1	1	1	61	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	10	-	1	1	1	1	39	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	13	29	58	135	423	-	33	98	194	482	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	15	21	30	68	181	-	28	42	80	195	424	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	22	36	57	108	243	-	51	80	165	373	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	118	159	211	277	376	-	363	443	-	-	-	-
21	73	104	150	222	387	-	242	368	474	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	2
23	64	82	113	176	327	-	191	266	354	-	-	-
24	56	78	115	164	338	-	213	313	402	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	85	110	152	231	375	-	283	344	471	-	-	-
27	74	107	160	248	436	-	245	346	448	-	-	-

Table 89. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

ORDER_LOG		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.39	11.92
2	49.41	9.54
3	48.73	9.28
4	0.38	0.08
5	49.83	9.45
6	49.91	9.99
7	0.41	0.08
8	51.60	9.97
9	49.11	9.52
10	0.39	0.08
11	52.73	10.16
12	48.20	9.58
13	0.41	0.08
14	53.70	10.27
15	48.96	9.48
16	0.41	0.08
17	51.58	10.20
18	47.98	9.26
19	0.39	0.08
20	50.32	9.87
21	52.08	10.15
22	0.41	0.09
23	52.64	10.50
24	52.85	10.14
25	0.39	0.08
26	51.32	10.03
27	49.46	9.71

Table 90. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_10						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.61%	*99.54%*	*99.71%*	98.87%	*98.58%*	*99.05%*
3	99.88%	*99.81%*	*99.91%*	99.60%	*99.53%*	*99.65%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.59%	*98.41%*	*98.80%*	96.98%	*96.56%*	*97.57%*
6	99.21%	*98.93%*	*99.44%*	97.97%	*97.64%*	*98.19%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.15%	*99.06%*	*99.26%*	97.39%	*96.75%*	*97.99%*
9	99.67%	*99.62%*	*99.82%*	98.84%	*98.71%*	*99.09%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.76%	*94.03%*	*97.57%*	89.03%	*85.81%*	*90.83%*
12	99.75%	*99.69%*	*99.78%*	99.38%	*99.34%*	*99.44%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.25%	*96.81%*	*98.24%*	93.42%	*93.07%*	*93.90%*
15	98.24%	*97.88%*	*98.46%*	97.26%	*97.15%*	*97.43%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.82%	*95.99%*	*97.29%*	91.21%	*90.32%*	*92.59%*
18	98.74%	*98.60%*	*98.88%*	97.25%	*97.00%*	*97.60%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	90.98%	*89.53%*	*93.51%*	73.33%	*68.84%*	*75.56%*
21	94.39%	*92.46%*	*96.28%*	82.75%	*74.48%*	*85.67%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	95.01%	*93.03%*	*96.12%*	84.37%	*83.12%*	*86.56%*
24	95.55%	*93.20%*	*97.46%*	83.15%	*82.28%*	*83.78%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	92.84%	*91.69%*	*94.44%*	80.73%	*79.97%*	*82.80%*
27	93.88%	*92.82%*	*94.65%*	81.31%	*80.09%*	*82.73%*

Table 91. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_10												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	8	-	1	1	1	1	78	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	12	-	1	1	1	1	39	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	10	21	42	97	318	-	23	110	232	386	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	2
14	12	16	25	64	197	-	32	57	91	216	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	19	29	45	90	266	-	55	99	190	387	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	2
20	126	170	227	383	-	-	443	-	-	-	-	-
21	80	108	166	269	367	-	273	325	471	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	2
23	60	80	101	175	402	-	236	322	406	-	-	-
24	53	71	104	184	357	-	224	333	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	77	103	155	267	-	-	302	464	-	-	-	-
27	75	99	148	244	-	-	306	431	-	-	-	-

Table 92. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

TOP_10		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	0.74	0.09
2	51.59	9.75
3	52.17	9.89
4	0.97	0.10
5	52.31	9.54
6	50.35	9.38
7	0.74	0.08
8	49.61	9.37
9	50.41	9.37
10	0.74	0.08
11	49.89	9.45
12	51.78	9.53
13	0.96	0.11
14	52.35	9.54
15	50.17	9.29
16	0.80	0.09
17	50.40	9.52
18	51.97	9.47
19	0.77	0.09
20	49.70	9.51
21	52.14	9.97
22	0.96	0.10
23	51.54	10.11
24	53.26	9.58
25	0.85	0.09
26	49.34	9.53
27	50.80	9.46

Table 93. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_20						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.62%	*99.50%*	*99.82%*	98.80%	*98.67%*	*99.05%*
3	99.89%	*99.82%*	*99.93%*	99.58%	*99.50%*	*99.67%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.63%	*98.14%*	*99.01%*	97.02%	*96.36%*	*97.43%*
6	99.24%	*99.00%*	*99.33%*	97.96%	*97.69%*	*98.32%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	99.12%	*98.96%*	*99.37%*	97.33%	*96.56%*	*97.75%*
9	99.64%	*99.57%*	*99.75%*	98.58%	*98.33%*	*98.70%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	95.61%	*92.98%*	*97.28%*	88.42%	*85.57%*	*90.76%*
12	99.75%	*99.64%*	*99.82%*	99.35%	*99.26%*	*99.43%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	97.20%	*96.69%*	*97.75%*	93.42%	*92.72%*	*94.65%*
15	98.11%	*97.86%*	*98.52%*	97.32%	*97.19%*	*97.51%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	96.71%	*96.04%*	*97.29%*	90.66%	*89.54%*	*91.80%*
18	98.31%	*97.67%*	*98.55%*	97.35%	*97.13%*	*97.54%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	91.34%	*87.01%*	*93.76%*	74.68%	*71.34%*	*80.07%*
21	93.27%	*91.67%*	*96.10%*	81.56%	*77.65%*	*85.46%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	95.31%	*93.20%*	*97.06%*	83.97%	*80.21%*	*86.21%*
24	95.24%	*94.32%*	*96.54%*	84.86%	*81.94%*	*88.57%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	93.13%	*91.62%*	*95.90%*	80.88%	*78.17%*	*84.23%*
27	93.49%	*91.09%*	*95.56%*	81.01%	*77.42%*	*84.01%*

Table 94. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_20												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	14	-	1	1	1	1	63	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	15	-	1	1	1	1	53	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	15	33	64	140	334	-	42	127	306	433	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	17	23	34	73	195	-	36	48	86	249	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	25	37	60	117	304	-	66	109	198	435	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	139	175	238	303	-	-	406	465	-	-	-	-
21	89	118	176	309	359	-	319	373	494	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	118	139	182	254	404	-	222	349	406	-	-	-
24	58	72	107	204	416	-	240	316	424	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	103	133	204	307	344	-	318	414	-	-	-	-
27	92	121	162	287	383	-	305	406	-	-	-	-

Table 95. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

	TOP_20	
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	1.17181	0.09678
2	55.39155	9.65788
3	58.41568	9.34746
4	1.29273	0.11463
5	53.62986	9.46933
6	62.8159	9.72548
7	1.26882	0.09819
8	54.31588	9.4995
9	62.44217	9.41975
10	1.22864	0.09791
11	56.0119	9.98489
12	65.05239	9.93499
13	1.41368	0.12318
14	56.85694	9.87275
15	62.97401	9.60114
16	1.39881	0.11682
17	57.41184	9.98721
18	68.34424	9.60264
19	1.27998	0.10432
20	55.72967	9.98815
21	62.27662	9.70404
22	1.42406	0.11684
23	51.1816	9.461
24	60.23342	9.47425
25	1.36946	0.11107
26	53.68729	9.71577
27	59.28932	9.54482

Table 96. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_30						
	fitness value					
case #	**population 500**			**population 100**		
	avg	*min*	*max*	avg	*min*	*max*
1	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
2	99.49%	*99.35%*	*99.60%*	98.54%	*98.40%*	*98.70%*
3	99.80%	*99.74%*	*99.84%*	99.50%	*99.46%*	*99.55%*
4	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
5	98.28%	*97.85%*	*98.47%*	96.46%	*96.26%*	*96.81%*
6	99.08%	*98.83%*	*99.22%*	97.74%	*97.53%*	*97.91%*
7	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
8	98.60%	*98.41%*	*98.67%*	96.93%	*96.78%*	*97.11%*
9	99.34%	*99.24%*	*99.55%*	98.52%	*98.26%*	*98.79%*
10	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
11	94.51%	*93.66%*	*96.24%*	86.49%	*85.17%*	*88.03%*
12	99.69%	*99.60%*	*99.82%*	99.29%	*99.22%*	*99.40%*
13	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
14	91.97%	*84.78%*	*96.13%*	91.85%	*91.15%*	*92.60%*
15	97.94%	*97.78%*	*98.06%*	97.17%	*97.11%*	*97.23%*
16	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
17	95.67%	*95.05%*	*96.24%*	88.88%	*87.38%*	*90.82%*
18	98.41%	*98.02%*	*98.80%*	96.99%	*96.70%*	*97.20%*
19	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
20	66.13%	*54.73%*	*90.70%*	64.93%	*58.14%*	*69.87%*
21	90.92%	*89.17%*	*92.64%*	76.89%	*71.73%*	*80.05%*
22	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
23	28.63%	*23.71%*	*34.49%*	83.32%	*81.69%*	*85.59%*
24	94.90%	*92.69%*	*95.94%*	81.50%	*79.38%*	*83.36%*
25	100.00%	*100.00%*	*100.00%*	100.00%	*100.00%*	*100.00%*
26	40.15%	*33.08%*	*45.14%*	76.15%	*74.01%*	*81.43%*
27	91.83%	*90.33%*	*93.21%*	75.36%	*71.35%*	*77.89%*

Table 97. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 1-27 in our experiments.

TOP_30												
	population 500						**population 100**					
case #	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	-	1	1	1	1	1	-
3	1	1	1	1	1	-	1	1	1	1	1	-
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	23	-	1	1	1	1	80	-
6	1	1	1	1	1	-	1	1	1	1	1	-
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	19	-	1	1	1	1	57	-
9	1	1	1	1	1	-	1	1	1	1	1	-
10	1	1	1	1	1	1	1	1	1	1	1	1
11	27	53	92	183	269	-	57	166	425	-	-	-
12	1	1	1	1	1	-	1	1	1	1	1	-
13	1	1	1	1	1	1	1	1	1	1	1	1
14	26	36	59	135	330	-	42	61	123	322	-	-
15	1	1	1	1	1	-	1	1	1	1	1	-
16	1	1	1	1	1	1	1	1	1	1	1	1
17	37	56	92	173	422	-	84	153	285	416	-	-
18	1	1	1	1	1	-	1	1	1	1	1	-
19	1	1	1	1	1	1	1	1	1	1	1	1
20	176	213	274	438	-	-	-	-	-	-	-	-
21	121	184	280	420	-	-	389	496	-	-	-	-
22	1	1	1	1	1	1	1	1	1	1	1	1
23	-	-	-	-	-	-	262	383	404	-	-	-
24	102	131	170	255	432	-	364	436	-	-	-	-
25	1	1	1	1	1	1	1	1	1	1	1	1
26	-	-	-	-	-	-	427	477	-	-	-	-
27	130	180	245	365	-	-	467	-	-	-	-	-

Table 98. Average time of the optimizations of synthetic datasets for Cases 1-27 in our experiments. The average time is displayed as seconds.

TOP_30		
	pop. 500	**pop. 100**
case #	avg. time	avg. time
1	1.66	0.11
2	64.71	9.42
3	81.17	9.53
4	1.86	0.14
5	63.24	9.53
6	77.64	10.09
7	1.78	0.12
8	64.47	9.62
9	79.50	9.62
10	1.70	0.11
11	62.37	9.35
12	79.87	9.52
13	1.88	0.14
14	58.28	9.39
15	81.19	9.78
16	1.85	0.14
17	65.46	9.58
18	79.24	9.64
19	1.77	0.12
20	51.90	9.35
21	76.40	9.54
22	1.92	0.14
23	49.60	9.37
24	75.33	9.93
25	1.93	0.14
26	54.55	9.53
27	78.37	10.00

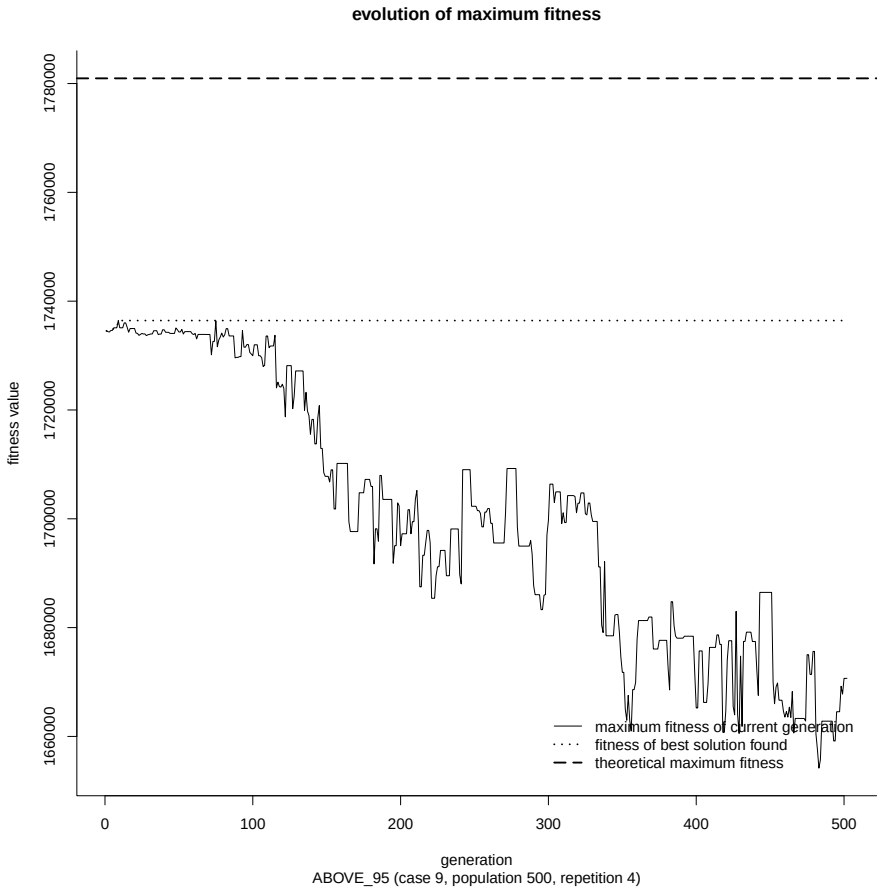

Fig. 32. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

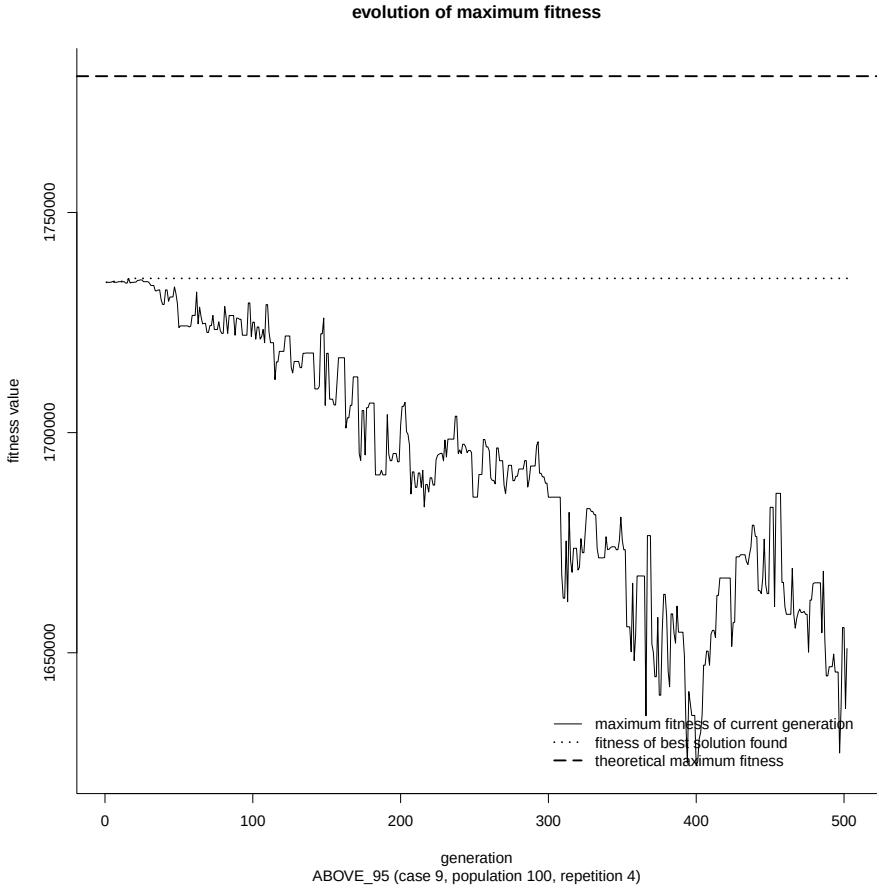

Fig. 33. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

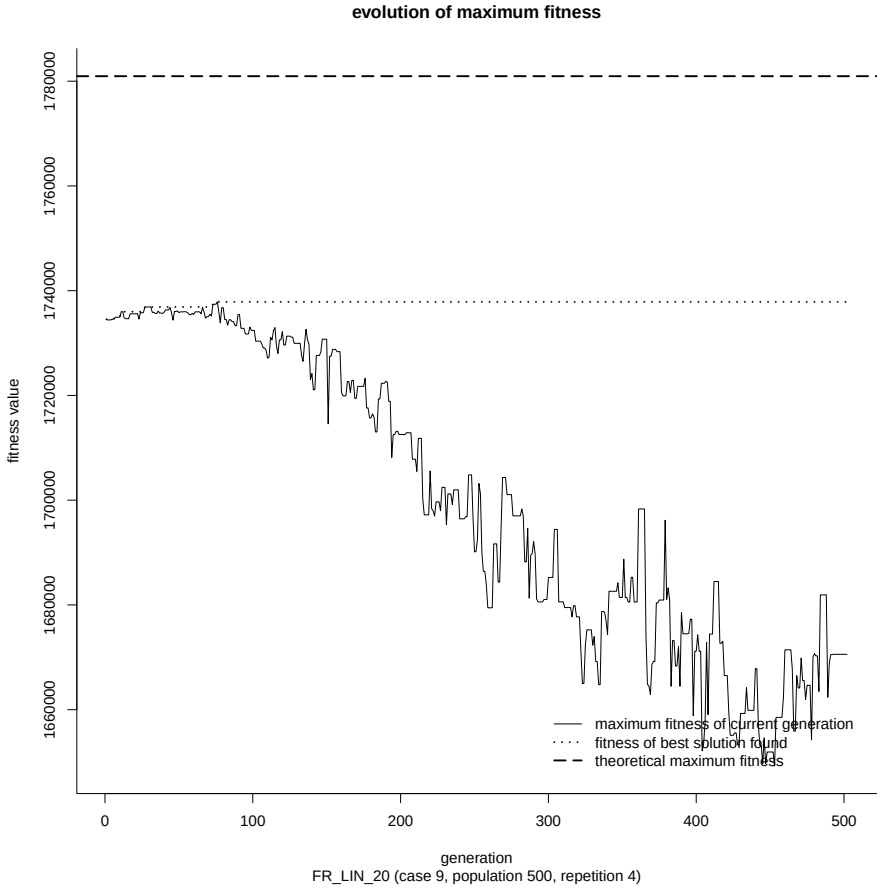

Fig. 34. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

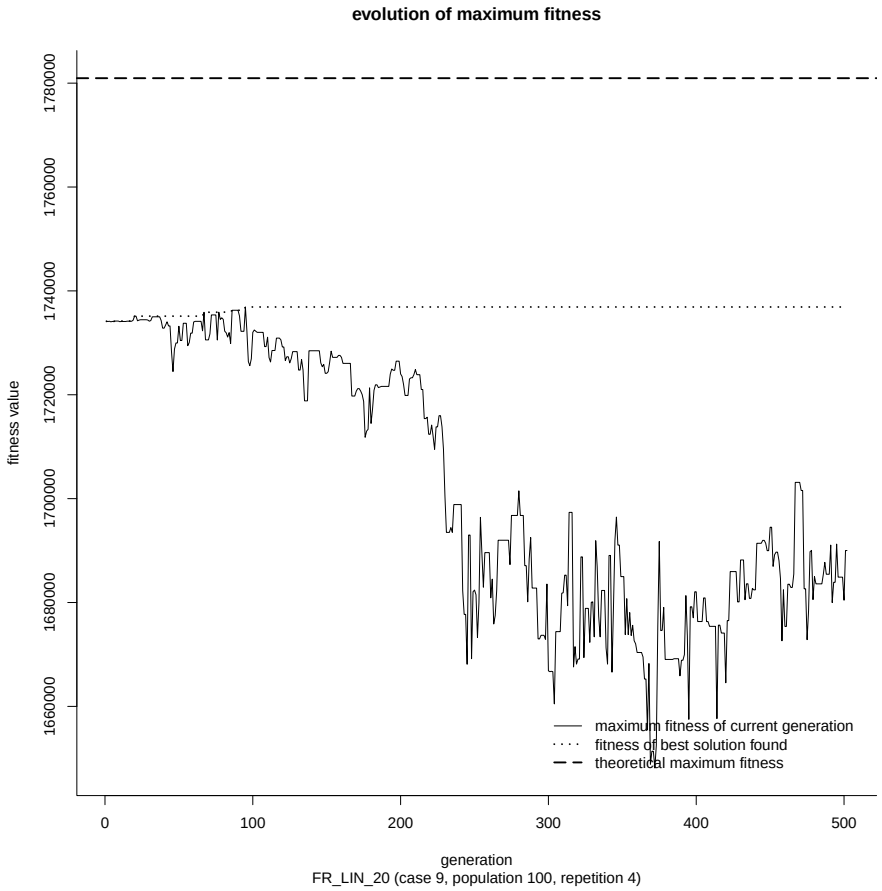

Fig. 35. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

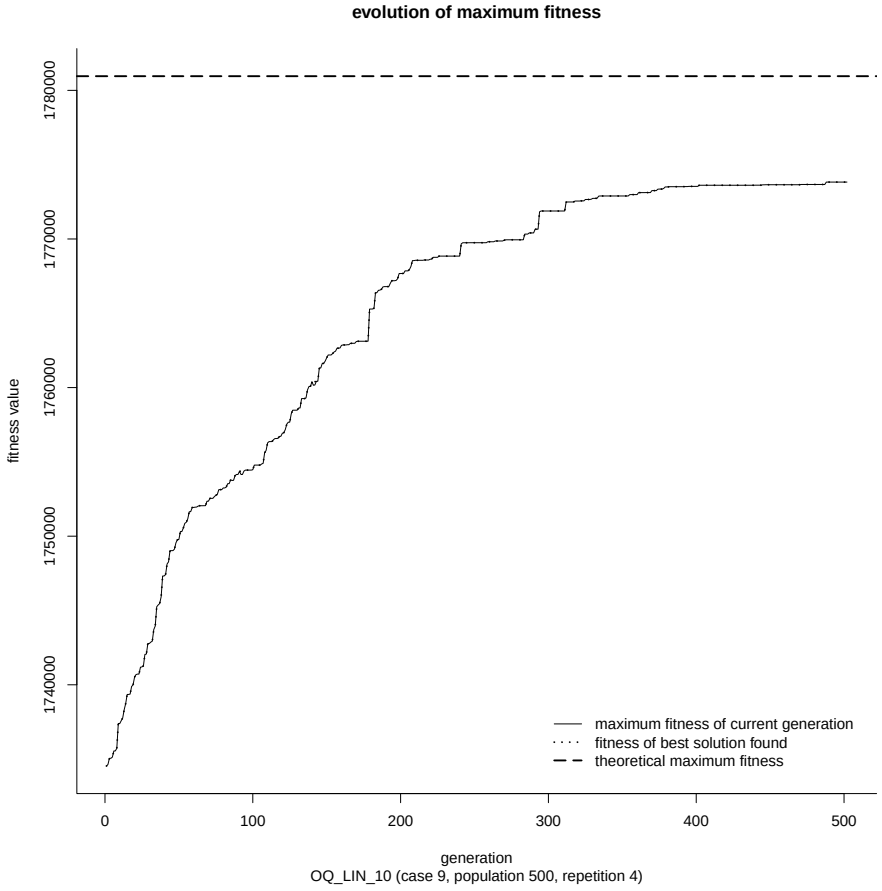

Fig. 36. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

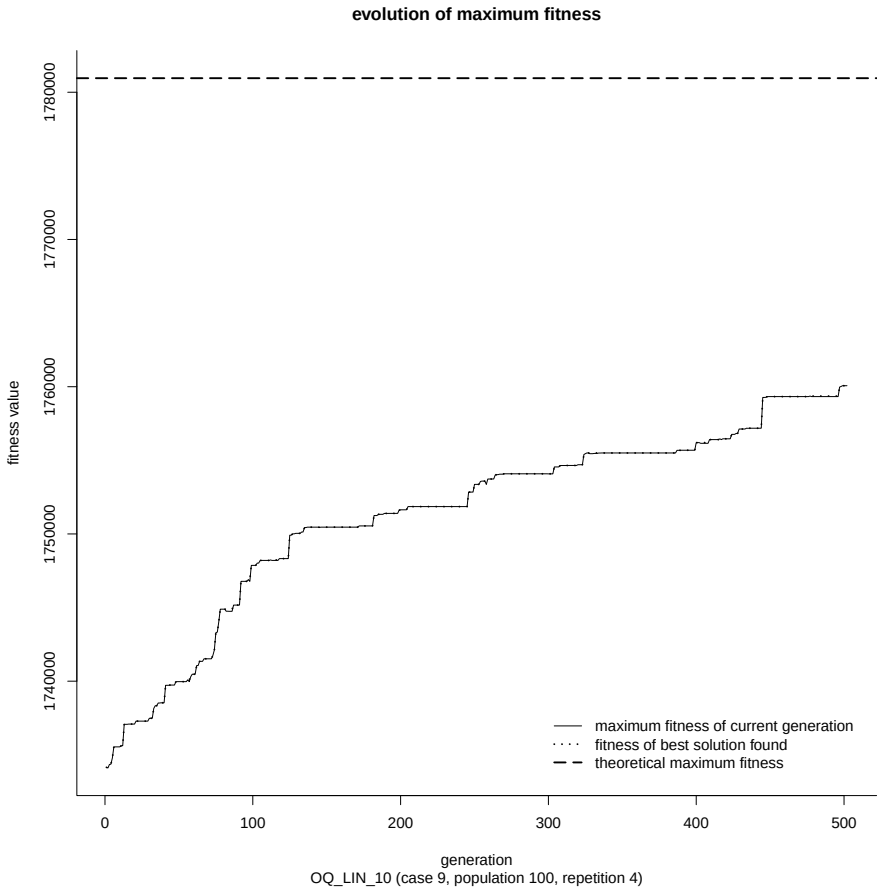

Fig. 37. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

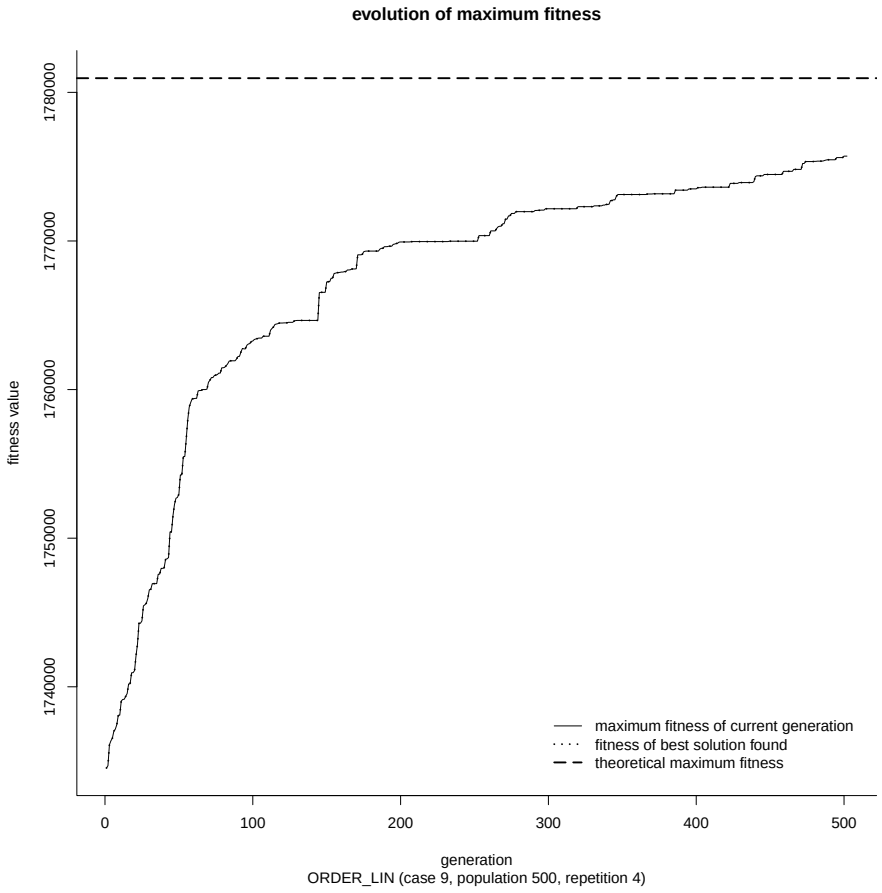

Fig. 38. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

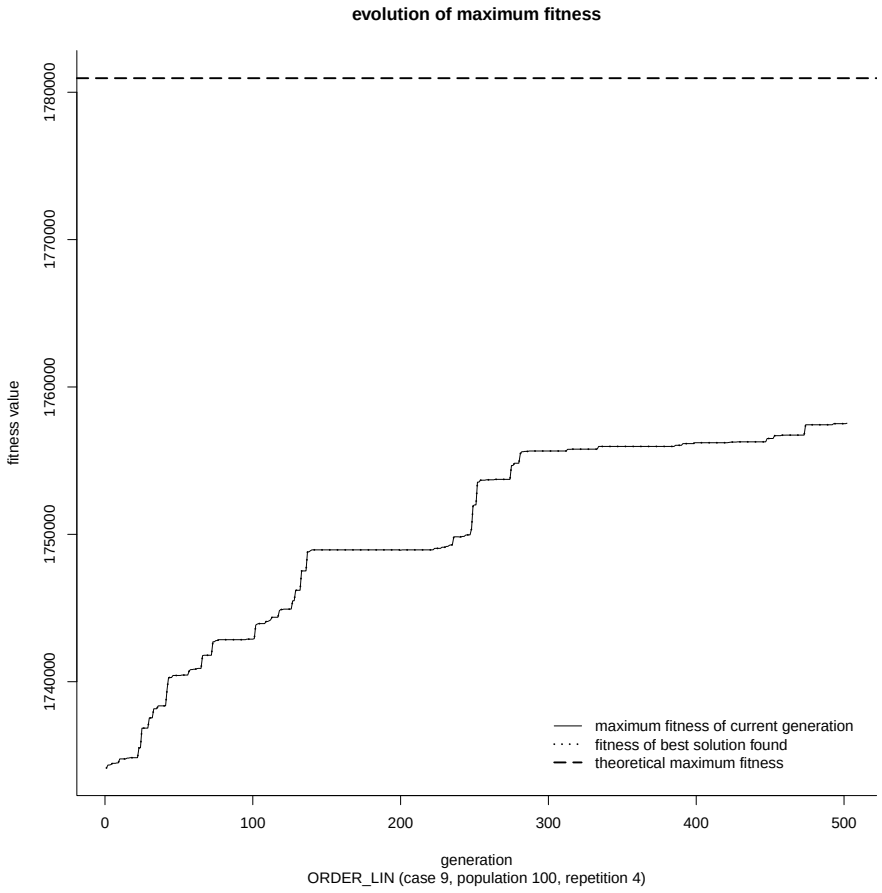

Fig. 39. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

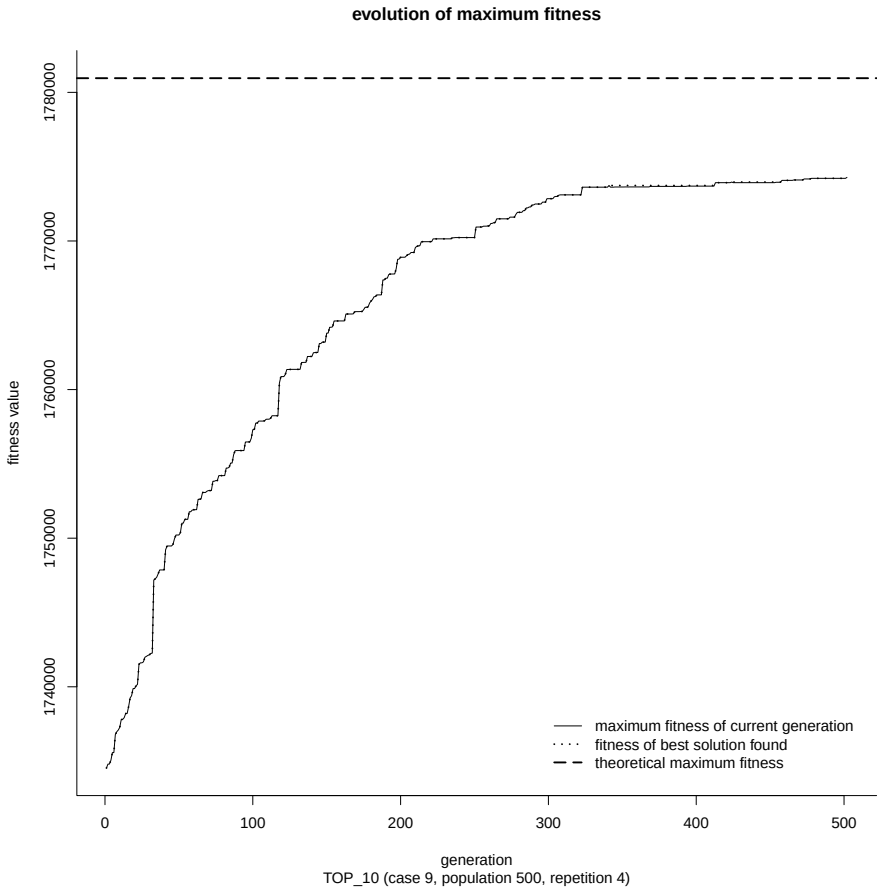

Fig. 40. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

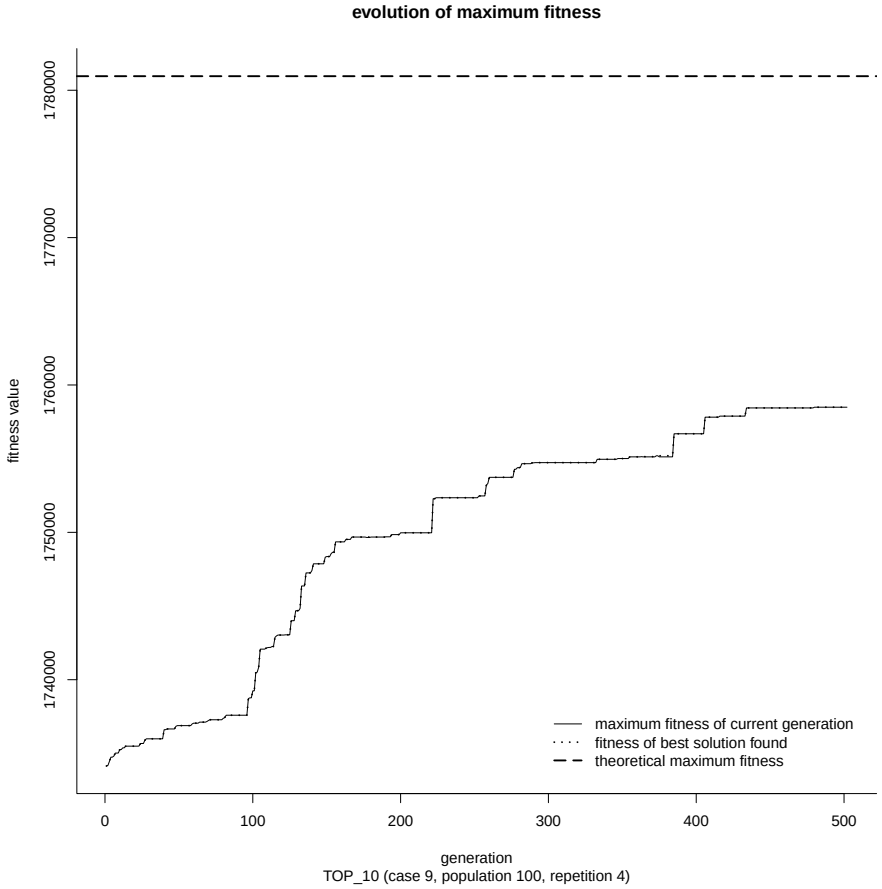

Fig. 41. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

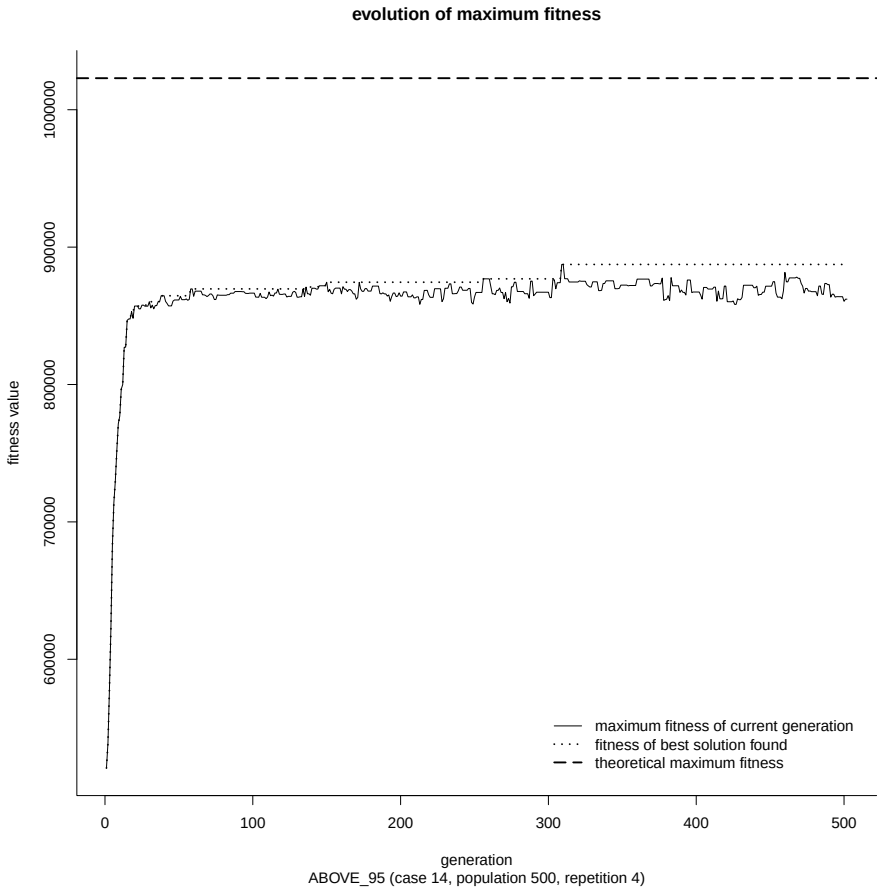

Fig. 42. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

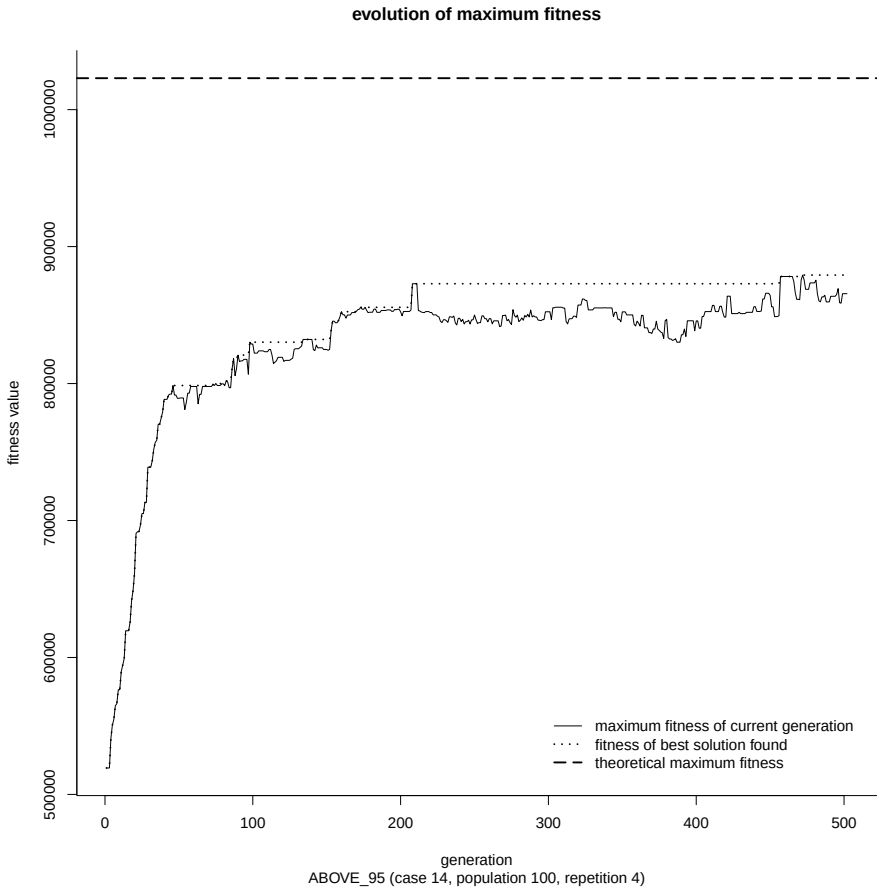

Fig. 43. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

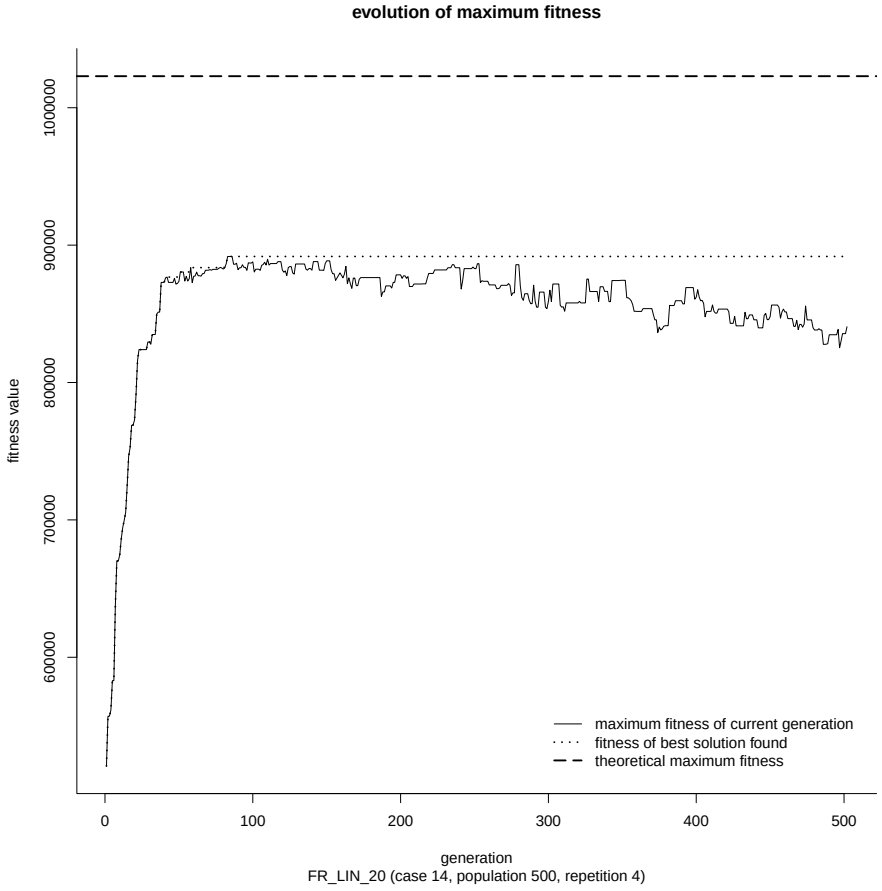

Fig. 44. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

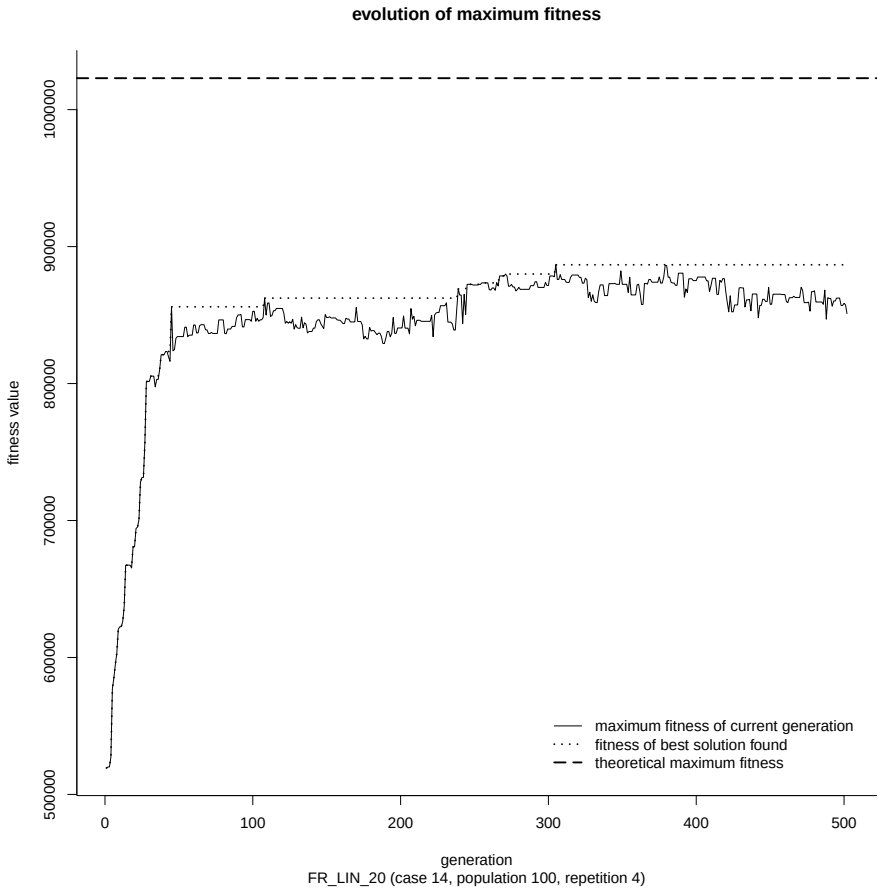

Fig. 45. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

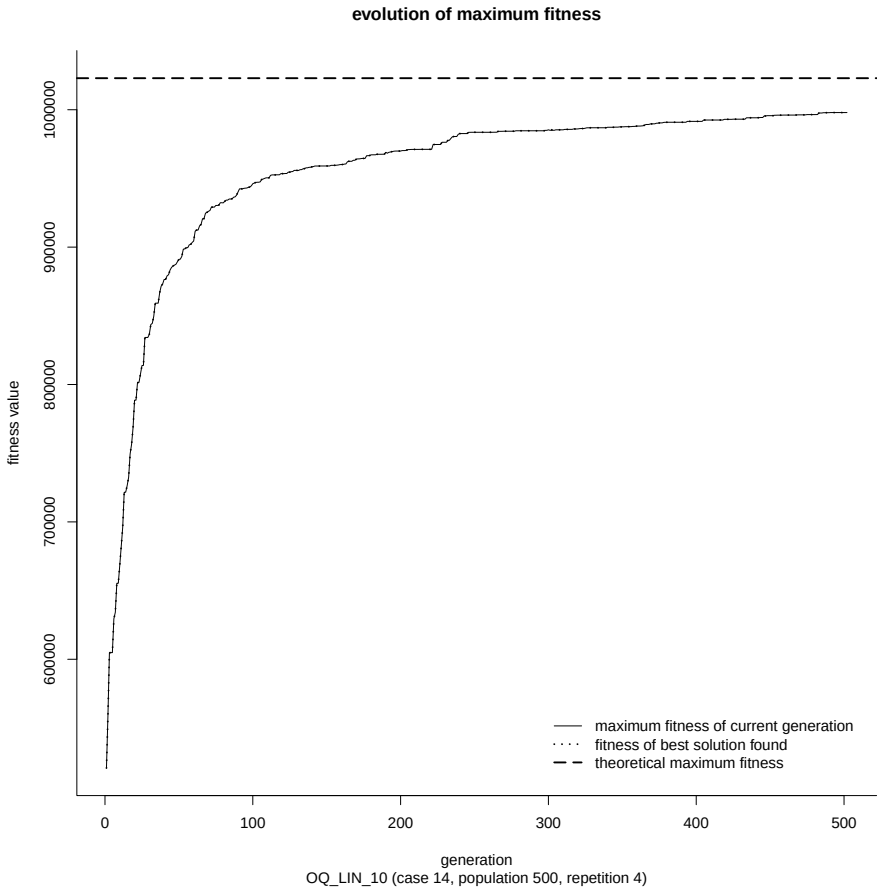

Fig. 46. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

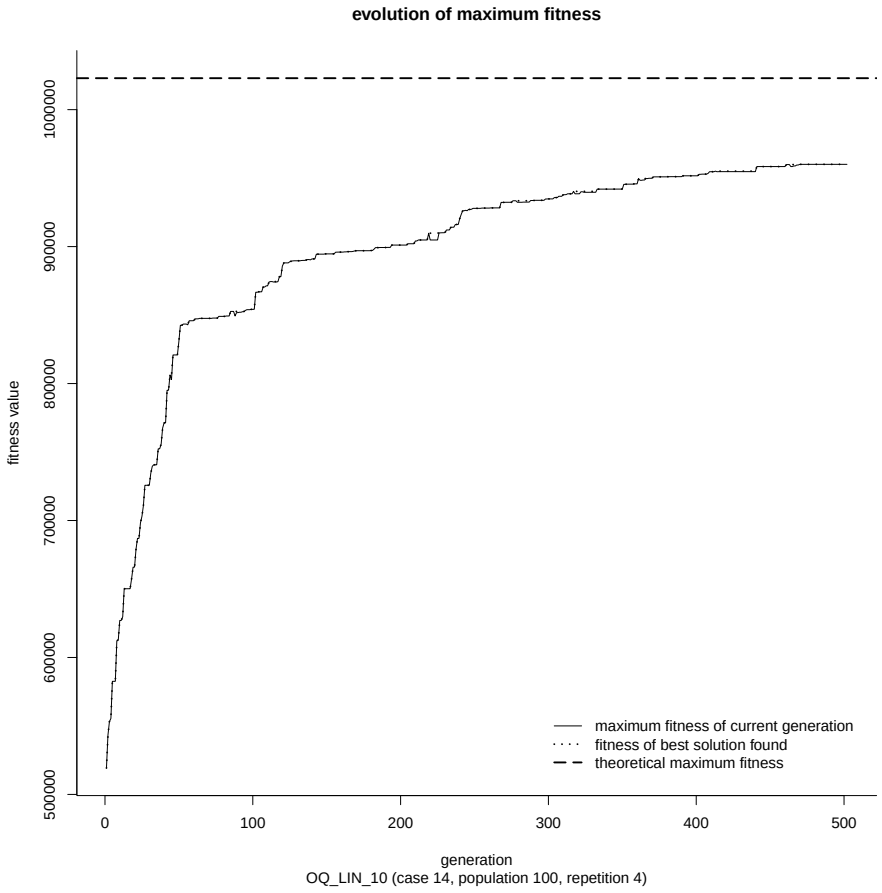

Fig. 47. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

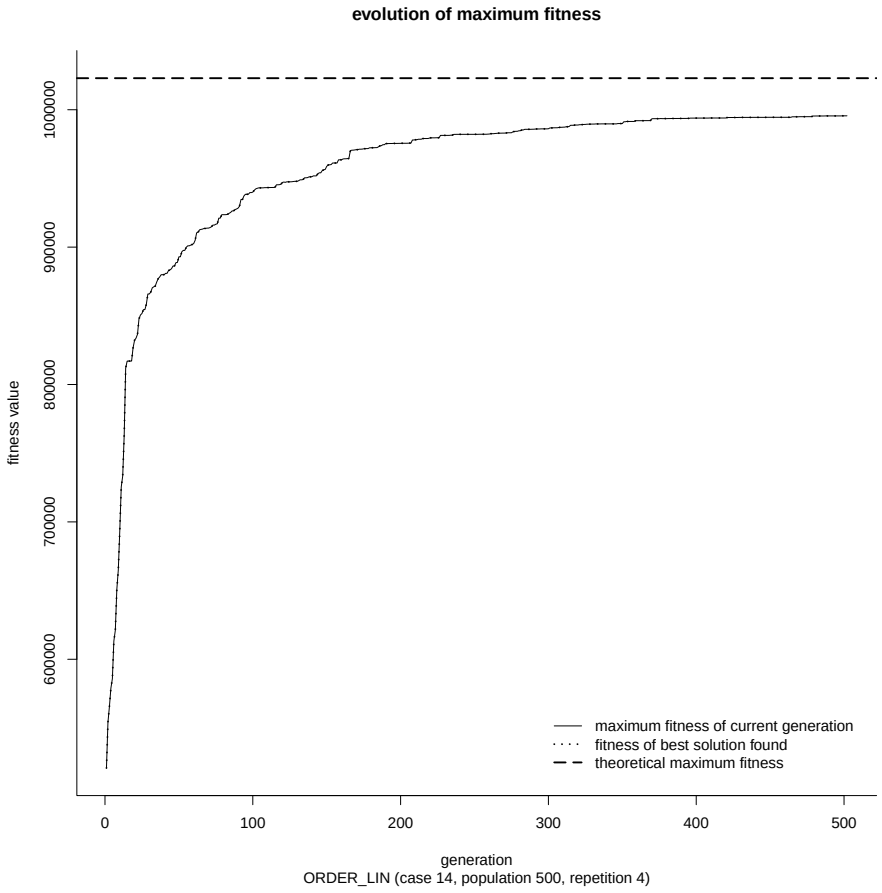

Fig. 48. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

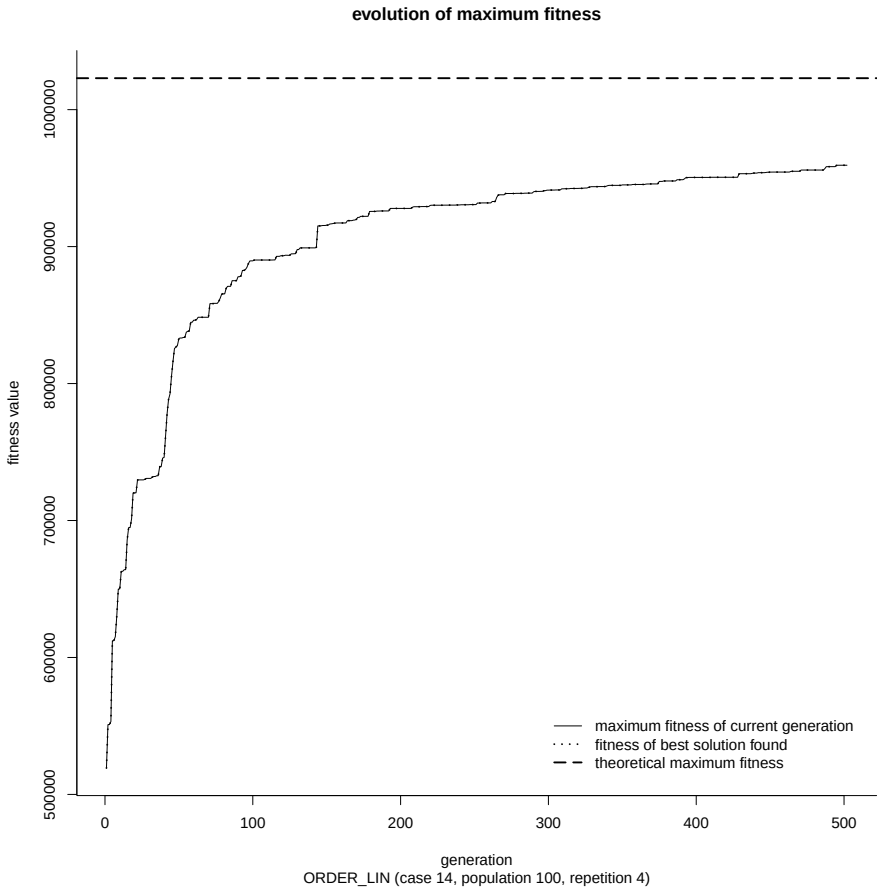

Fig. 49. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

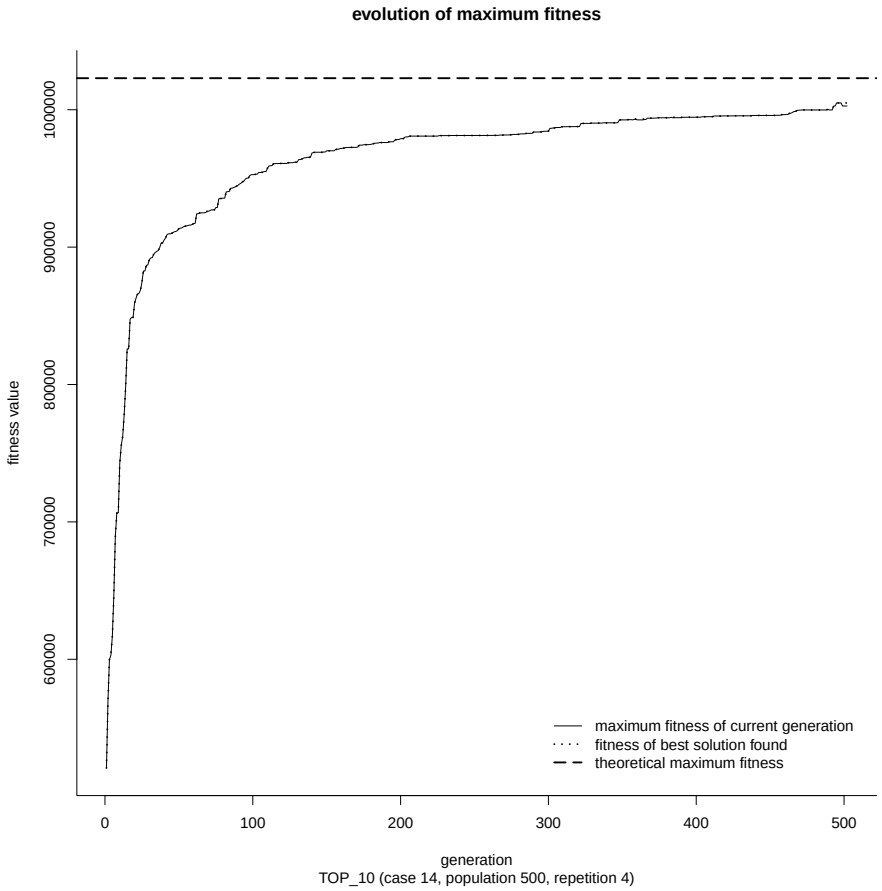

Fig. 50. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

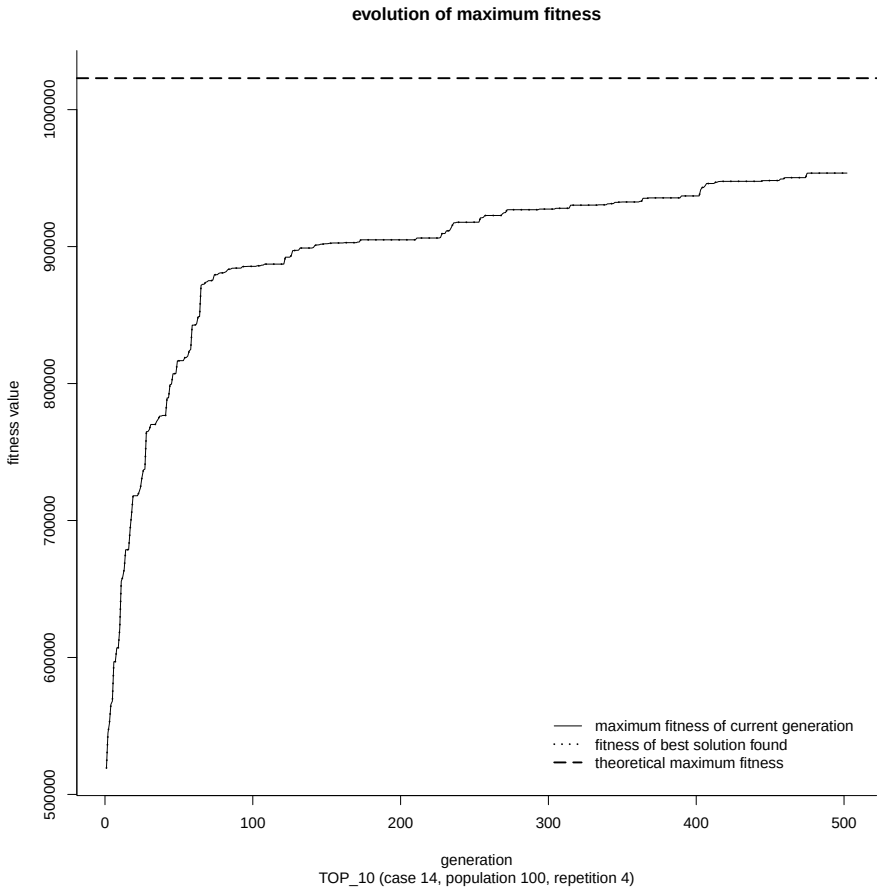

Fig. 51. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

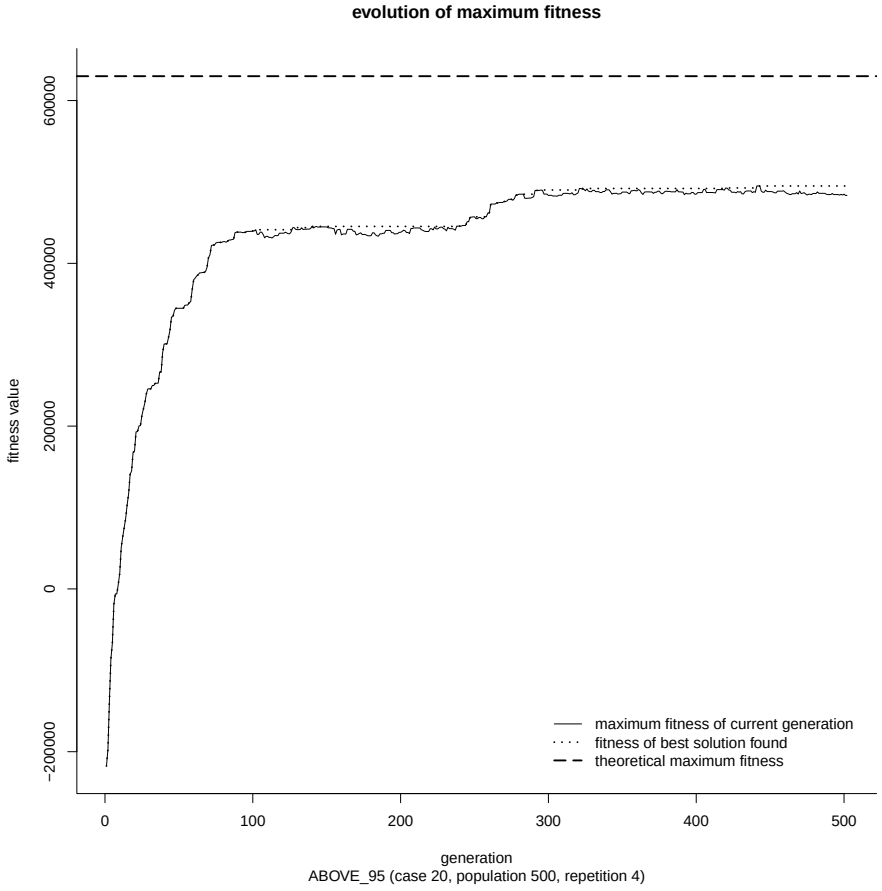

Fig. 52. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

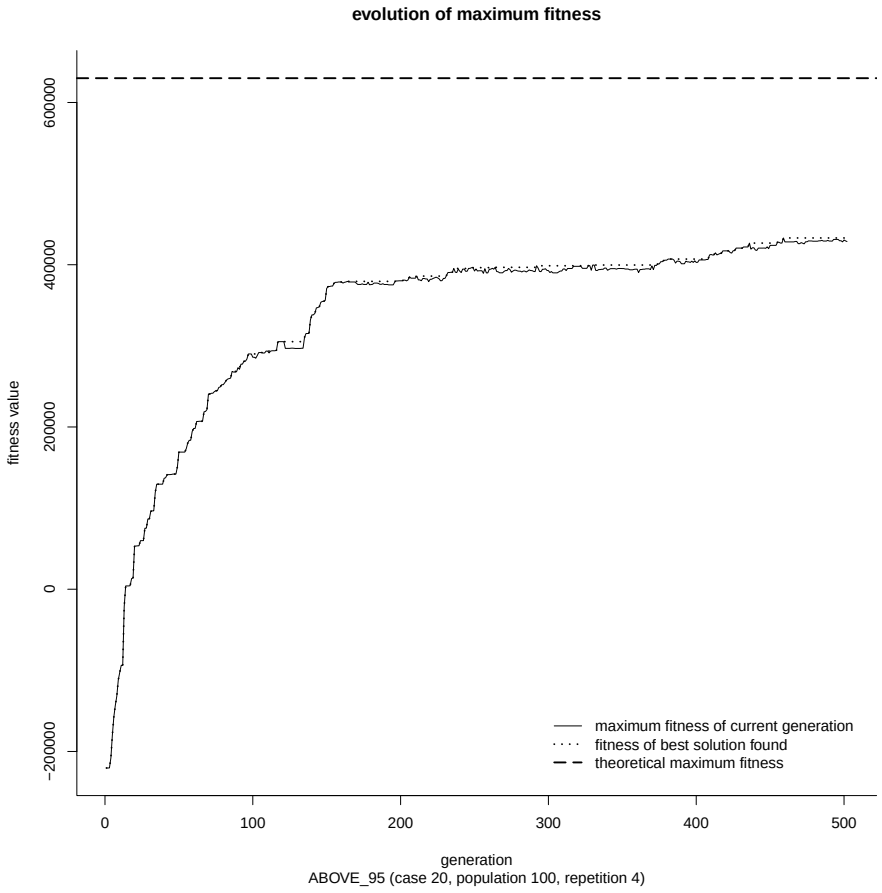

Fig. 53. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

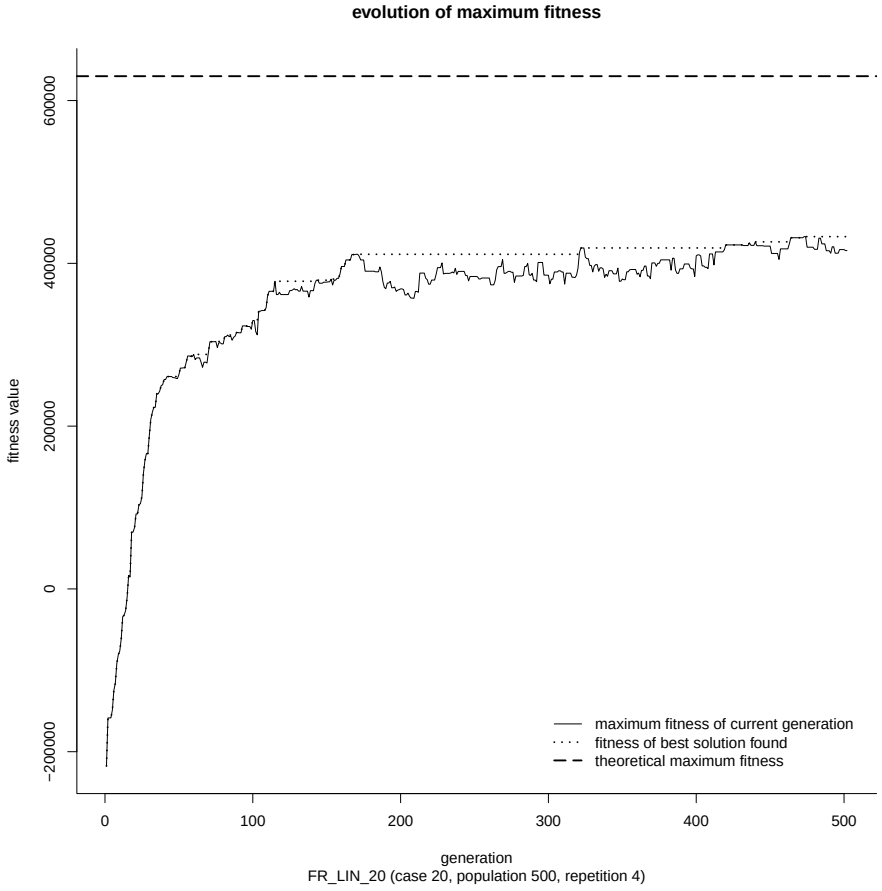

Fig. 54. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

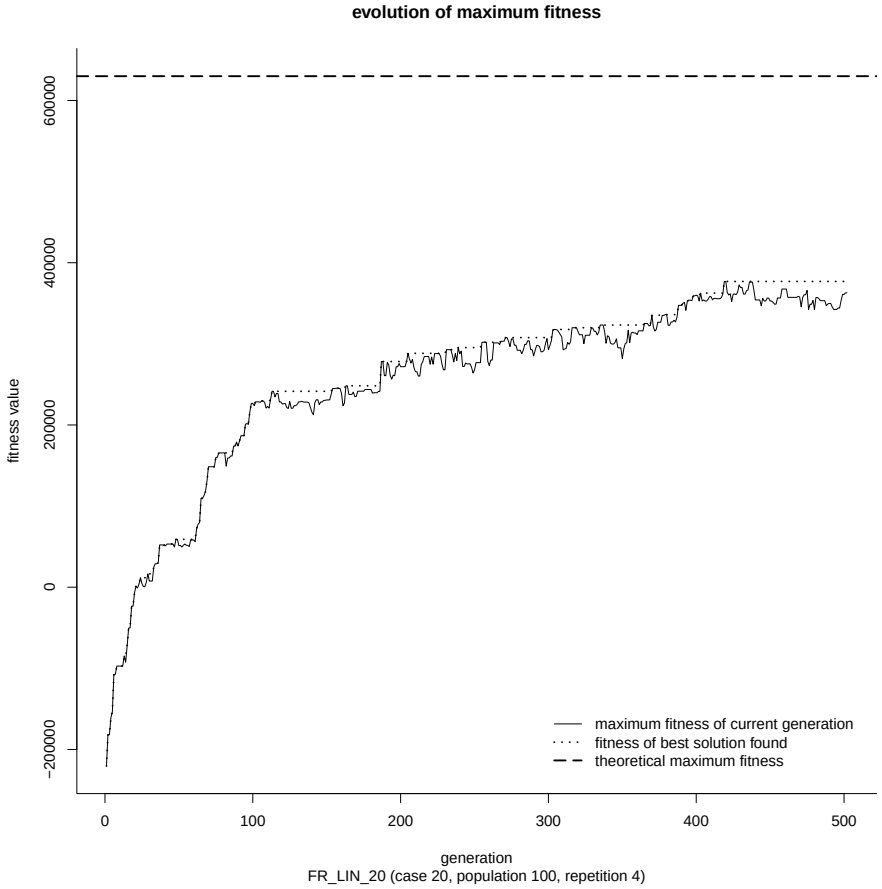

Fig. 55. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

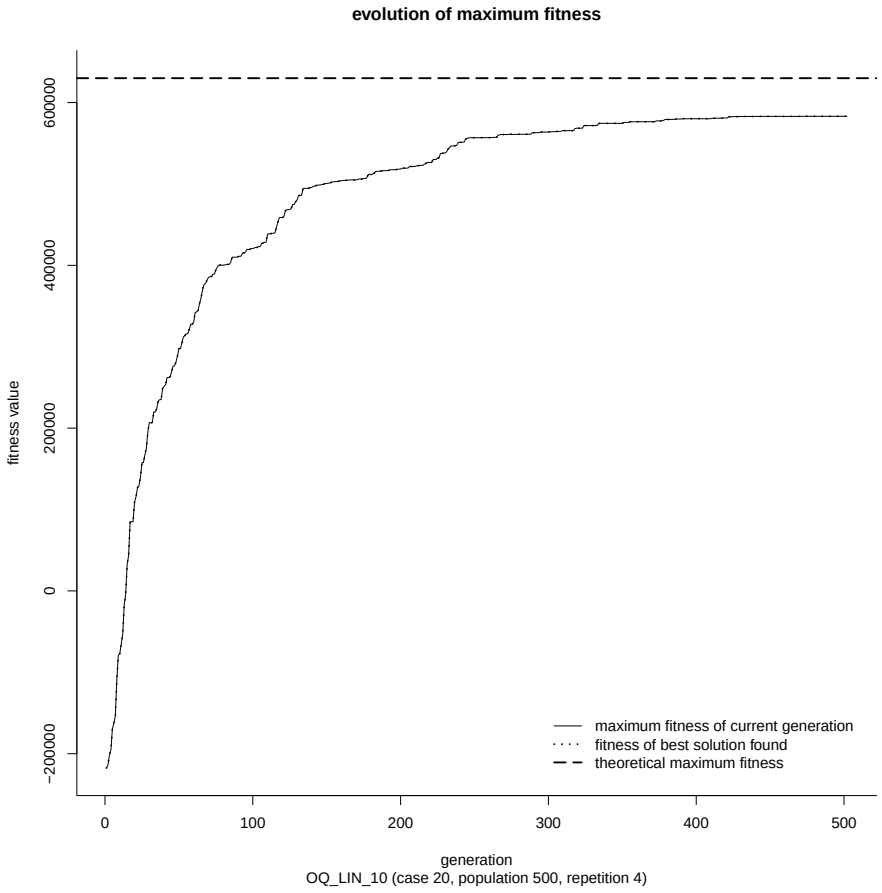

Fig. 56. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

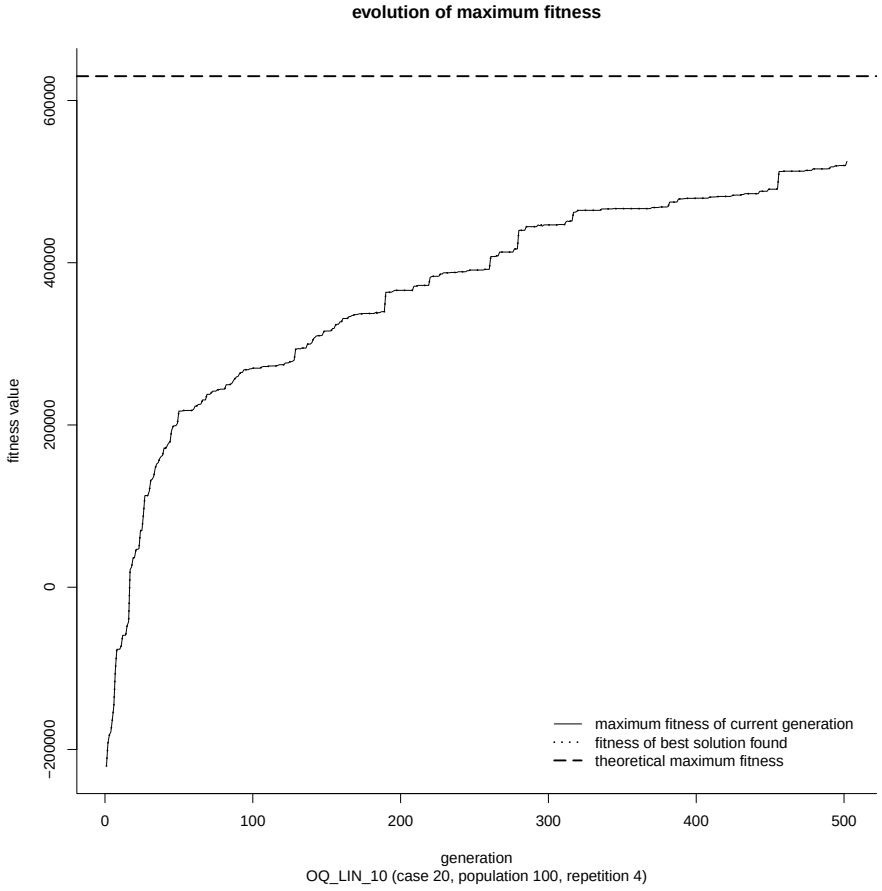

Fig. 57. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

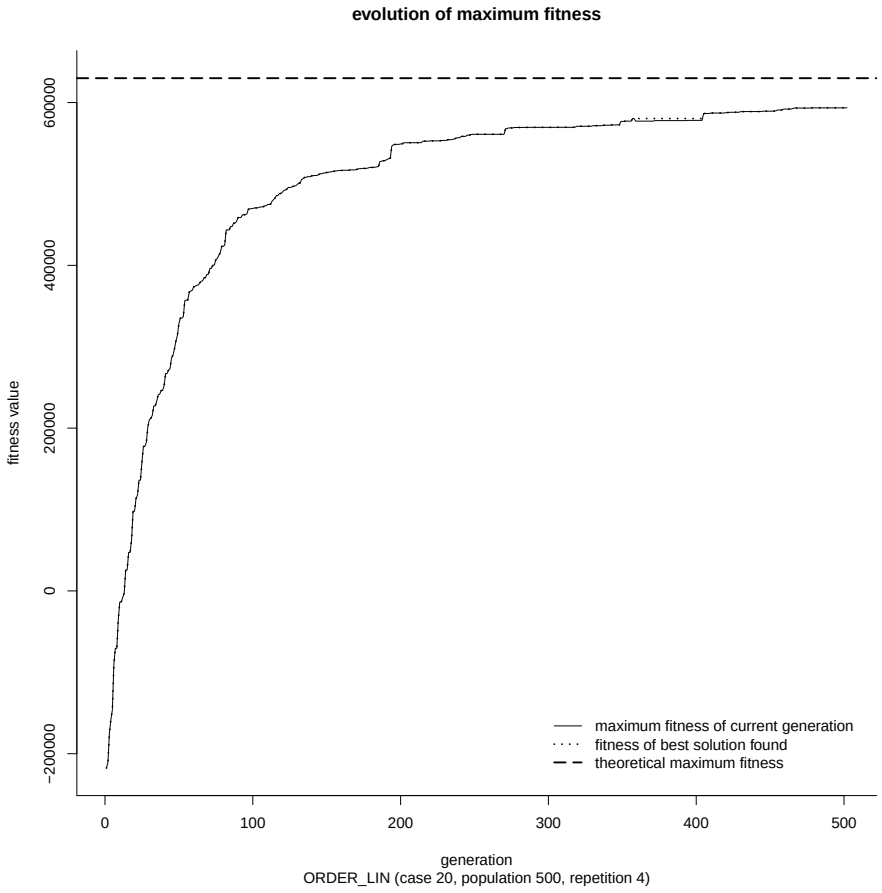

Fig. 58. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

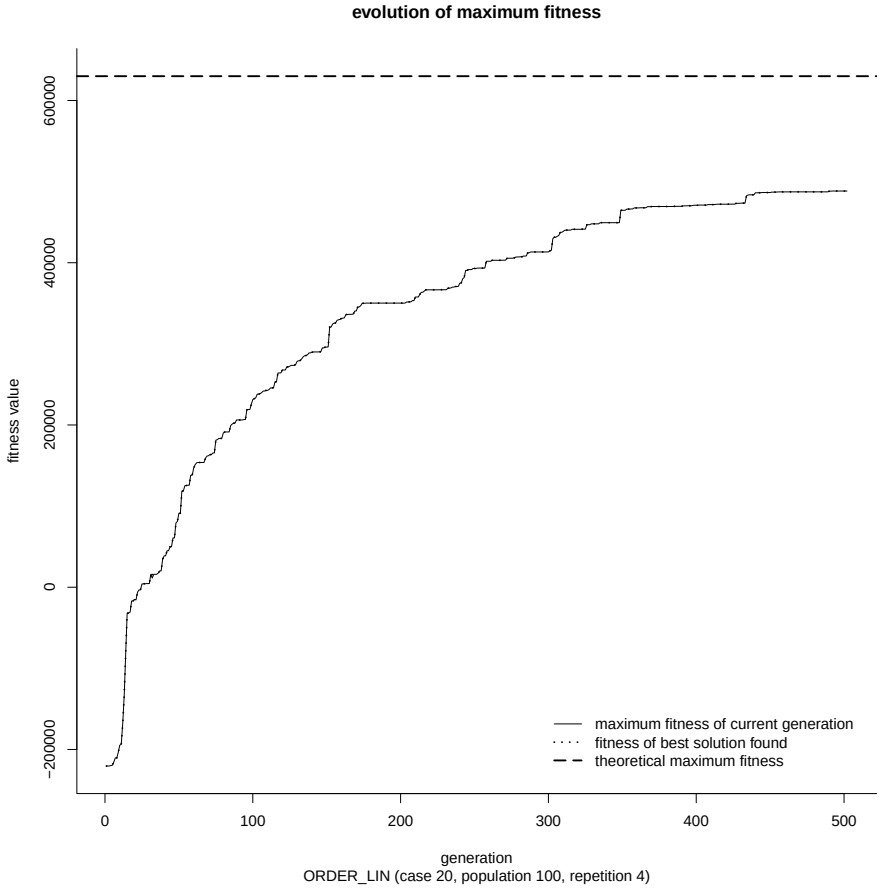

Fig. 59. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

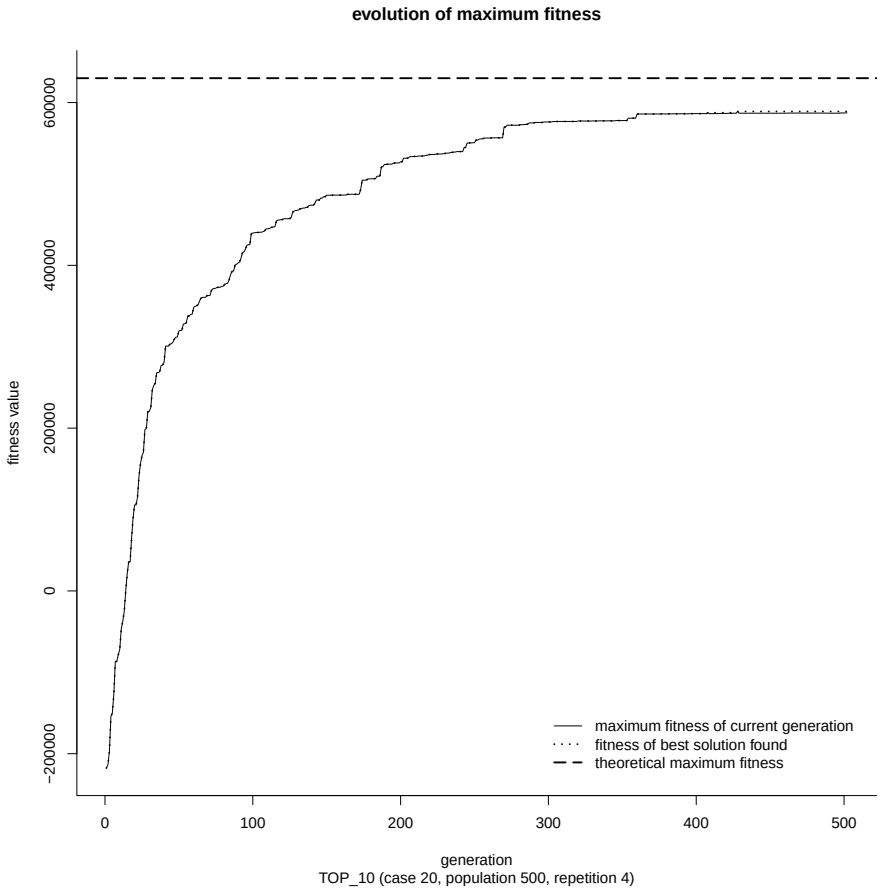

Fig. 60. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

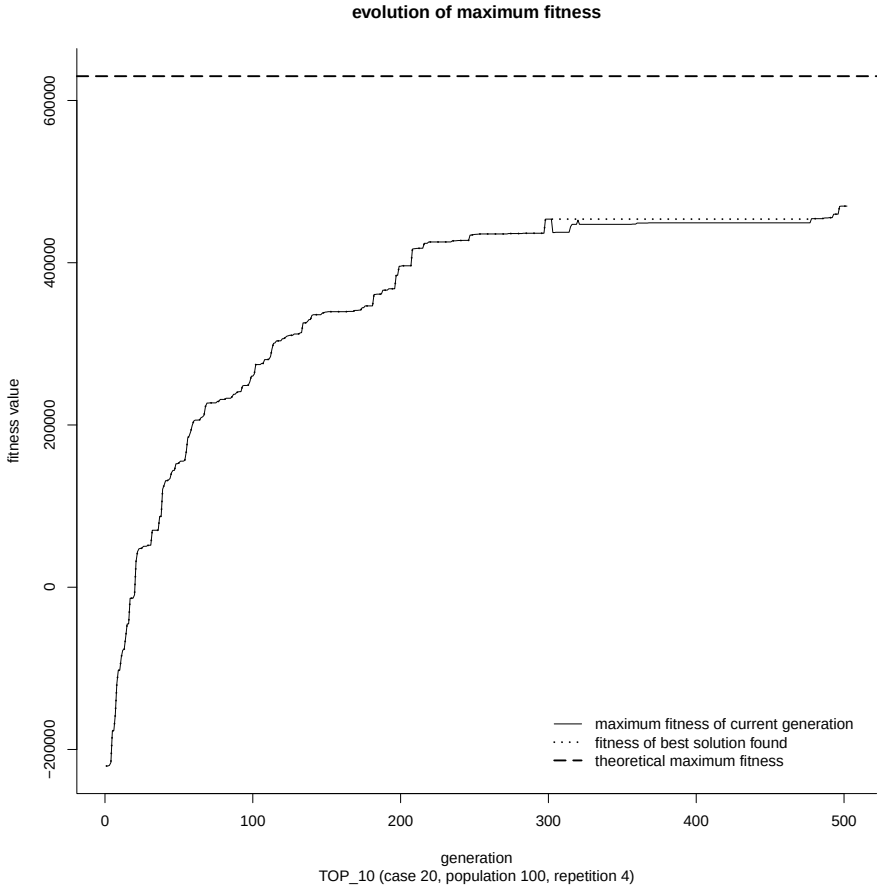

Fig. 61. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

2.4 Run 3

Compared to the second run (compare 2.3), this run included only the cases 28-47, the maximum iterations have been set to 1500 and only configuration 1 with a population size of 100 has been tested. The tables presented in this section compare the results of the included cases with those achieved during the second run. Additionally, the GA facilitated knowledge about the best solution in each generation. Opposed to run 2, this allowed the GA to assign the highest estimated fitness value in each generation to the actual best solution, and thereby increase its likelihood for selection for those methods that do not disclose the actual order of the individuals.

Table 99. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_70									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	55.01%	*53.36%*	*58.15%*	47.73%	*45.89%*	*49.20%*	88.27%	*84.36%*	*92.34%*
29	54.72%	*51.51%*	*59.80%*	46.47%	*44.24%*	*50.20%*	86.60%	*83.91%*	*89.74%*
30	53.42%	*51.08%*	*57.95%*	43.29%	*40.88%*	*45.58%*	84.76%	*82.50%*	*87.63%*
31	51.27%	*49.04%*	*53.53%*	44.35%	*40.00%*	*49.66%*	84.20%	*80.64%*	*88.20%*
32	51.28%	*49.85%*	*53.55%*	44.43%	*40.24%*	*47.97%*	85.00%	*81.17%*	*88.88%*
33	53.34%	*51.23%*	*55.91%*	44.32%	*41.44%*	*47.74%*	85.10%	*83.47%*	*86.43%*
34	51.98%	*49.33%*	*54.34%*	47.50%	*45.43%*	*50.66%*	84.79%	*82.89%*	*87.16%*
35	52.70%	*50.44%*	*55.67%*	47.25%	*44.51%*	*49.95%*	84.46%	*80.27%*	*88.24%*
36	49.15%	*45.19%*	*51.49%*	44.45%	*40.96%*	*47.68%*	85.72%	*82.82%*	*89.05%*
37	50.24%	*48.84%*	*52.12%*	43.18%	*40.19%*	*44.85%*	82.78%	*80.87%*	*84.27%*
38	37.80%	*36.25%*	*39.74%*	33.32%	*31.33%*	*35.93%*	70.89%	*68.40%*	*74.67%*
39	39.47%	*36.69%*	*41.34%*	34.21%	*31.89%*	*37.23%*	71.60%	*70.21%*	*73.42%*
40	40.07%	*38.36%*	*41.77%*	34.31%	*32.31%*	*36.61%*	74.67%	*70.94%*	*76.26%*
41	39.77%	*38.28%*	*41.61%*	33.43%	*30.83%*	*35.29%*	72.90%	*71.21%*	*73.83%*
42	39.63%	*38.77%*	*40.44%*	32.66%	*29.32%*	*35.64%*	72.61%	*69.83%*	*74.57%*
43	40.22%	*38.62%*	*44.27%*	33.67%	*31.42%*	*35.57%*	73.12%	*72.30%*	*75.02%*
44	39.94%	*37.20%*	*42.19%*	33.02%	*31.23%*	*35.25%*	72.78%	*69.14%*	*74.88%*
45	39.46%	*37.44%*	*41.31%*	33.15%	*30.23%*	*37.30%*	73.93%	*72.44%*	*75.58%*
46	38.73%	*36.60%*	*42.08%*	32.41%	*30.69%*	*33.79%*	70.78%	*68.84%*	*72.05%*
47	41.84%	*40.26%*	*43.87%*	34.20%	*31.91%*	*36.34%*	74.63%	*72.07%*	*76.99%*

Table 100. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_70																						
	population 500						**population 100**															
case #	**500 generations**						**500 generations**						**1500 generations**									
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%				
28	-	-	-	-	-	-	-	-	-	-	-	-	556	779	1105	1371	-	-				
29	-	-	-	-	-	-	-	-	-	-	-	-	670	910	1132	-	-	-				
30	-	-	-	-	-	-	-	-	-	-	-	-	675	927	1158	-	-	-				
31	-	-	-	-	-	-	-	-	-	-	-	-	792	1036	1132	-	-	-				
32	-	-	-	-	-	-	-	-	-	-	-	-	713	1026	1221	-	-	-				
33	-	-	-	-	-	-	-	-	-	-	-	-	626	993	1373	-	-	-				
34	-	-	-	-	-	-	-	-	-	-	-	-	628	951	1351	-	-	-				
35	-	-	-	-	-	-	-	-	-	-	-	-	674	1019	1214	-	-	-				
36	-	-	-	-	-	-	-	-	-	-	-	-	637	952	1240	-	-	-				
37	-	-	-	-	-	-	-	-	-	-	-	-	782	1216	-	-	-	-				
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
40	-	-	-	-	-	-	-	-	-	-	-	-	1400	-	-	-	-	-				
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
43	-	-	-	-	-	-	-	-	-	-	-	-	1480	-	-	-	-	-				
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
45	-	-	-	-	-	-	-	-	-	-	-	-	1447	-	-	-	-	-				
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
47	-	-	-	-	-	-	-	-	-	-	-	-	1272	-	-	-	-	-				

Table 101. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ABOVE_70			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	48.08	9.16	27.02
29	48.94	9.35	26.17
30	48.00	9.23	26.13
31	49.08	8.90	26.22
32	46.67	8.85	26.49
33	46.37	8.79	27.11
34	46.33	8.82	26.74
35	46.63	8.88	26.24
36	46.31	8.82	26.06
37	47.79	9.35	26.73
38	96.50	17.65	53.13
39	92.96	17.72	52.25
40	92.73	18.42	52.22
41	99.05	18.70	52.10
42	98.13	18.29	52.20
43	97.90	18.69	52.19
44	99.02	18.60	52.15
45	98.85	18.56	54.09
46	98.07	18.77	52.79
47	98.05	18.44	52.36

Table 102. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_80									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	64.54%	*63.14%*	*66.24%*	56.91%	*51.16%*	*61.33%*	90.26%	*87.27%*	*91.85%*
29	65.23%	*62.96%*	*67.15%*	56.78%	*54.77%*	*59.74%*	88.47%	*86.11%*	*89.57%*
30	63.32%	*60.16%*	*65.23%*	52.12%	*49.47%*	*55.86%*	87.74%	*85.06%*	*89.42%*
31	60.76%	*60.23%*	*61.71%*	53.71%	*50.06%*	*56.80%*	85.80%	*83.50%*	*86.74%*
32	64.09%	*60.01%*	*67.05%*	54.32%	*50.87%*	*57.67%*	89.56%	*87.88%*	*91.87%*
33	64.37%	*63.22%*	*65.69%*	51.66%	*49.38%*	*54.81%*	87.83%	*83.56%*	*90.56%*
34	65.78%	*60.93%*	*70.48%*	55.28%	*49.29%*	*59.76%*	89.33%	*87.50%*	*90.51%*
35	64.10%	*60.81%*	*67.30%*	53.26%	*51.33%*	*56.18%*	88.58%	*84.27%*	*91.34%*
36	61.26%	*58.89%*	*64.69%*	53.03%	*51.91%*	*54.13%*	86.90%	*86.08%*	*87.96%*
37	64.56%	*63.95%*	*66.01%*	52.13%	*50.74%*	*53.21%*	88.20%	*86.57%*	*90.76%*
38	50.19%	*49.09%*	*51.79%*	39.44%	*37.07%*	*41.40%*	76.48%	*73.28%*	*80.10%*
39	49.97%	*47.40%*	*52.60%*	39.61%	*36.52%*	*42.35%*	76.05%	*74.77%*	*79.10%*
40	49.21%	*47.69%*	*50.94%*	42.44%	*40.80%*	*43.37%*	78.55%	*74.77%*	*82.37%*
41	50.15%	*47.28%*	*53.10%*	39.47%	*37.94%*	*40.65%*	76.87%	*75.65%*	*78.26%*
42	50.76%	*48.54%*	*53.35%*	41.86%	*40.02%*	*43.41%*	76.79%	*74.23%*	*78.42%*
43	51.42%	*49.18%*	*53.23%*	40.63%	*38.88%*	*42.54%*	77.80%	*76.04%*	*79.41%*
44	51.94%	*50.38%*	*53.01%*	40.60%	*38.60%*	*43.77%*	77.28%	*75.77%*	*79.98%*
45	49.57%	*47.30%*	*52.77%*	41.13%	*39.11%*	*42.30%*	77.58%	*77.10%*	*78.35%*
46	51.31%	*50.06%*	*53.66%*	40.25%	*37.63%*	*43.44%*	76.54%	*73.57%*	*78.29%*
47	51.58%	*48.25%*	*53.62%*	43.80%	*42.05%*	*45.03%*	79.89%	*78.49%*	*81.53%*

Table 103. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_80																						
	population 500						**population 100**															
case #	**500 generations**						**500 generations**						**1500 generations**									
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%				
28	-	-	-	-	-	-	-	-	-	-	-	-	375	535	822	1301	-	-				
29	-	-	-	-	-	-	-	-	-	-	-	-	524	762	1090	-	-	-				
30	-	-	-	-	-	-	-	-	-	-	-	-	617	818	1202	-	-	-				
31	-	-	-	-	-	-	-	-	-	-	-	-	626	847	1276	-	-	-				
32	-	-	-	-	-	-	-	-	-	-	-	-	509	724	1050	1300	-	-				
33	-	-	-	-	-	-	-	-	-	-	-	-	511	706	929	1445	-	-				
34	-	-	-	-	-	-	-	-	-	-	-	-	466	654	954	1395	-	-				
35	-	-	-	-	-	-	-	-	-	-	-	-	592	757	1106	1382	-	-				
36	-	-	-	-	-	-	-	-	-	-	-	-	479	786	1214	-	-	-				
37	-	-	-	-	-	-	-	-	-	-	-	-	484	718	1194	1222	-	-				
38	-	-	-	-	-	-	-	-	-	-	-	-	1275	1479	-	-	-	-				
39	-	-	-	-	-	-	-	-	-	-	-	-	1315	-	-	-	-	-				
40	-	-	-	-	-	-	-	-	-	-	-	-	1175	1226	-	-	-	-				
41	-	-	-	-	-	-	-	-	-	-	-	-	1279	-	-	-	-	-				
42	-	-	-	-	-	-	-	-	-	-	-	-	1239	-	-	-	-	-				
43	-	-	-	-	-	-	-	-	-	-	-	-	1254	-	-	-	-	-				
44	-	-	-	-	-	-	-	-	-	-	-	-	1320	-	-	-	-	-				
45	-	-	-	-	-	-	-	-	-	-	-	-	1170	-	-	-	-	-				
46	-	-	-	-	-	-	-	-	-	-	-	-	1283	-	-	-	-	-				
47	-	-	-	-	-	-	-	-	-	-	-	-	1056	1367	-	-	-	-				

Table 104. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ABOVE_80			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	46.51	8.92	26.58
29	48.18	8.93	26.81
30	46.63	8.84	26.63
31	46.67	8.94	26.37
32	46.75	9.07	26.51
33	46.66	8.99	27.05
34	46.48	9.03	26.64
35	46.95	8.89	26.62
36	46.36	8.83	27.47
37	47.18	9.24	27.05
38	92.89	17.62	52.69
39	92.81	17.75	52.80
40	92.79	17.70	52.88
41	92.76	17.71	52.58
42	94.50	18.63	53.29
43	97.92	18.56	52.82
44	97.99	18.65	52.77
45	93.60	18.56	52.50
46	98.12	18.14	52.65
47	97.25	17.79	52.69

Table 105. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_90									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	80.87%	*78.42%*	*83.68%*	66.42%	*61.22%*	*70.25%*	93.04%	*91.06%*	*94.11%*
29	78.52%	*74.31%*	*81.26%*	64.17%	*61.69%*	*66.43%*	90.61%	*88.16%*	*94.04%*
30	76.89%	*73.62%*	*80.63%*	63.53%	*58.10%*	*68.47%*	88.12%	*85.83%*	*90.57%*
31	75.23%	*73.22%*	*76.27%*	60.12%	*58.13%*	*64.70%*	88.26%	*86.84%*	*90.94%*
32	78.00%	*74.10%*	*80.19%*	62.70%	*59.52%*	*65.24%*	90.61%	*89.42%*	*92.55%*
33	80.35%	*78.24%*	*82.38%*	65.08%	*58.19%*	*70.90%*	91.39%	*89.83%*	*94.46%*
34	78.44%	*77.54%*	*79.31%*	64.17%	*60.83%*	*67.84%*	88.77%	*85.20%*	*91.28%*
35	78.53%	*76.00%*	*81.56%*	64.97%	*60.68%*	*70.38%*	90.99%	*89.19%*	*92.42%*
36	78.99%	*75.54%*	*81.89%*	63.79%	*59.84%*	*68.15%*	90.14%	*87.26%*	*92.75%*
37	76.70%	*75.30%*	*79.65%*	62.74%	*60.74%*	*66.70%*	90.10%	*87.77%*	*93.59%*
38	65.36%	*63.27%*	*67.88%*	50.00%	*49.14%*	*50.77%*	80.41%	*78.32%*	*82.36%*
39	67.95%	*64.50%*	*72.48%*	49.56%	*45.28%*	*54.25%*	78.00%	*74.71%*	*79.47%*
40	66.25%	*63.58%*	*69.62%*	52.01%	*50.00%*	*54.25%*	81.53%	*77.96%*	*84.42%*
41	66.07%	*64.75%*	*67.54%*	51.94%	*50.27%*	*53.91%*	81.10%	*79.33%*	*83.58%*
42	67.36%	*64.25%*	*70.95%*	52.70%	*48.49%*	*56.29%*	81.47%	*79.65%*	*83.33%*
43	67.82%	*65.42%*	*69.69%*	49.97%	*47.07%*	*52.45%*	80.30%	*77.86%*	*82.70%*
44	66.91%	*65.37%*	*68.96%*	48.38%	*44.20%*	*53.09%*	78.99%	*76.87%*	*80.73%*
45	65.65%	*61.49%*	*67.87%*	51.82%	*49.75%*	*54.72%*	79.66%	*78.77%*	*80.99%*
46	65.91%	*63.89%*	*67.73%*	47.79%	*45.03%*	*49.62%*	80.53%	*78.23%*	*82.24%*
47	69.90%	*66.47%*	*71.54%*	52.29%	*50.11%*	*54.64%*	81.26%	*76.94%*	*84.42%*

Table 106. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_90																						
	population 500						**population 100**															
case #	**500 generations**						**500 generations**						**1500 generations**									
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%				
28	244	404	-	-	-	-	-	-	-	-	-	-	361	483	750	1003	-	-				
29	282	454	-	-	-	-	-	-	-	-	-	-	456	596	920	1238	-	-				
30	321	459	-	-	-	-	-	-	-	-	-	-	496	736	1125	1417	-	-				
31	383	-	-	-	-	-	-	-	-	-	-	-	520	744	1125	1438	-	-				
32	330	443	-	-	-	-	-	-	-	-	-	-	373	502	824	1190	-	-				
33	260	367	-	-	-	-	-	-	-	-	-	-	436	630	956	1239	-	-				
34	343	-	-	-	-	-	-	-	-	-	-	-	431	613	943	1328	-	-				
35	336	415	-	-	-	-	-	-	-	-	-	-	437	582	883	1249	-	-				
36	251	335	-	-	-	-	-	-	-	-	-	-	432	592	912	1191	-	-				
37	366	-	-	-	-	-	-	-	-	-	-	-	462	651	933	1283	-	-				
38	-	-	-	-	-	-	-	-	-	-	-	-	1019	1350	-	-	-	-				
39	-	-	-	-	-	-	-	-	-	-	-	-	1089	-	-	-	-	-				
40	-	-	-	-	-	-	-	-	-	-	-	-	961	1287	-	-	-	-				
41	-	-	-	-	-	-	-	-	-	-	-	-	977	1311	-	-	-	-				
42	-	-	-	-	-	-	-	-	-	-	-	-	996	1254	-	-	-	-				
43	-	-	-	-	-	-	-	-	-	-	-	-	982	1323	-	-	-	-				
44	-	-	-	-	-	-	-	-	-	-	-	-	1105	1269	-	-	-	-				
45	-	-	-	-	-	-	-	-	-	-	-	-	1154	1453	-	-	-	-				
46	-	-	-	-	-	-	-	-	-	-	-	-	1034	1355	-	-	-	-				
47	-	-	-	-	-	-	-	-	-	-	-	-	1025	1215	-	-	-	-				

Table 107. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ABOVE_90			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	46.60	8.95	26.63
29	46.92	9.02	26.66
30	46.90	8.99	26.68
31	46.95	9.04	26.65
32	48.41	9.11	26.63
33	46.75	8.98	26.72
34	46.63	9.47	26.64
35	48.47	8.99	26.72
36	47.34	9.21	26.67
37	49.25	8.97	26.69
38	93.37	17.85	53.39
39	93.75	18.04	53.33
40	98.68	18.11	53.58
41	94.33	18.97	53.56
42	99.08	18.89	53.28
43	99.47	18.41	54.30
44	95.70	18.92	53.80
45	93.66	17.73	53.11
46	93.65	17.89	53.07
47	93.32	17.74	53.20

Table 108. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_95									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	84.01%	*82.17%*	*85.71%*	70.68%	*67.62%*	*74.56%*	92.91%	*90.68%*	*94.99%*
29	82.33%	*78.96%*	*85.51%*	64.47%	*59.46%*	*67.83%*	91.15%	*90.31%*	*92.87%*
30	81.69%	*78.57%*	*85.64%*	67.65%	*65.88%*	*70.20%*	90.85%	*86.12%*	*93.26%*
31	78.69%	*73.40%*	*81.65%*	61.68%	*60.26%*	*64.27%*	89.73%	*85.67%*	*91.90%*
32	83.23%	*80.36%*	*85.79%*	65.70%	*62.70%*	*69.34%*	90.30%	*88.82%*	*92.33%*
33	80.92%	*79.20%*	*83.03%*	67.04%	*61.81%*	*74.58%*	89.87%	*86.28%*	*91.98%*
34	80.51%	*78.66%*	*81.39%*	66.46%	*64.27%*	*68.44%*	90.00%	*88.83%*	*90.70%*
35	82.14%	*78.45%*	*85.41%*	63.28%	*59.15%*	*67.18%*	90.25%	*88.33%*	*91.65%*
36	82.13%	*79.41%*	*86.29%*	68.33%	*63.11%*	*72.38%*	90.83%	*89.29%*	*92.40%*
37	79.37%	*75.71%*	*81.54%*	66.41%	*63.62%*	*69.63%*	89.92%	*86.82%*	*92.07%*
38	71.15%	*69.63%*	*73.54%*	53.14%	*51.38%*	*56.39%*	79.64%	*77.60%*	*80.50%*
39	72.04%	*67.97%*	*76.43%*	51.03%	*47.38%*	*56.66%*	78.72%	*76.35%*	*81.23%*
40	72.65%	*71.21%*	*74.59%*	54.50%	*52.26%*	*57.02%*	81.21%	*79.55%*	*83.12%*
41	74.77%	*72.27%*	*76.94%*	51.47%	*47.42%*	*53.26%*	80.62%	*77.08%*	*83.97%*
42	73.04%	*71.10%*	*74.89%*	54.15%	*48.30%*	*57.30%*	80.35%	*77.96%*	*81.77%*
43	73.55%	*68.05%*	*79.00%*	52.49%	*49.00%*	*56.53%*	81.35%	*80.08%*	*83.15%*
44	73.60%	*69.88%*	*77.55%*	52.99%	*51.07%*	*57.53%*	79.50%	*79.03%*	*80.48%*
45	72.56%	*68.79%*	*75.11%*	53.79%	*50.19%*	*55.84%*	80.44%	*78.77%*	*82.91%*
46	72.27%	*69.15%*	*74.43%*	51.64%	*47.99%*	*53.26%*	80.06%	*79.14%*	*82.42%*
47	75.21%	*74.24%*	*76.12%*	55.09%	*53.32%*	*56.85%*	83.30%	*79.68%*	*86.08%*

Table 109. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ABOVE_95																				
	population 500						**population 100**													
case #	**500 generations**						**500 generations**						**1500 generations**							
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%		
28	184	318	403	-	-	-	-	-	-	-	-	-	308	432	611	1077	-	-		
29	271	363	449	-	-	-	-	-	-	-	-	-	466	649	824	1267	-	-		
30	274	408	459	-	-	-	-	-	-	-	-	-	525	744	1044	1280	-	-		
31	286	425	-	-	-	-	-	-	-	-	-	-	459	715	1014	1330	-	-		
32	235	360	458	-	-	-	-	-	-	-	-	-	447	591	912	1313	-	-		
33	276	376	-	-	-	-	-	-	-	-	-	-	487	637	989	1349	-	-		
34	306	445	-	-	-	-	-	-	-	-	-	-	417	651	919	1423	-	-		
35	254	355	448	-	-	-	-	-	-	-	-	-	490	599	975	1275	-	-		
36	231	327	400	-	-	-	-	-	-	-	-	-	415	562	818	1253	-	-		
37	328	463	-	-	-	-	-	-	-	-	-	-	546	745	1063	1333	-	-		
38	-	-	-	-	-	-	-	-	-	-	-	-	1052	1438	-	-	-	-		
39	436	-	-	-	-	-	-	-	-	-	-	-	1135	1394	-	-	-	-		
40	-	-	-	-	-	-	-	-	-	-	-	-	954	1344	-	-	-	-		
41	471	-	-	-	-	-	-	-	-	-	-	-	1002	1343	-	-	-	-		
42	-	-	-	-	-	-	-	-	-	-	-	-	1050	1326	-	-	-	-		
43	449	-	-	-	-	-	-	-	-	-	-	-	989	1372	-	-	-	-		
44	471	-	-	-	-	-	-	-	-	-	-	-	1094	1444	-	-	-	-		
45	487	-	-	-	-	-	-	-	-	-	-	-	1023	1363	-	-	-	-		
46	-	-	-	-	-	-	-	-	-	-	-	-	1032	1391	-	-	-	-		
47	387	-	-	-	-	-	-	-	-	-	-	-	940	1078	1360	-	-	-		

Table 110. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ABOVE_95			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	46.03	9.20	26.86
29	50.60	9.70	27.15
30	50.77	9.75	26.98
31	50.71	9.52	26.92
32	45.72	9.02	26.81
33	47.71	9.12	26.83
34	47.43	9.13	26.94
35	48.12	9.13	27.78
36	47.54	9.23	27.55
37	49.08	9.44	27.08
38	97.73	19.32	53.95
39	100.22	19.00	54.62
40	100.35	18.72	55.75
41	100.46	19.35	53.76
42	96.78	18.23	54.12
43	96.40	18.60	55.40
44	95.22	18.24	54.86
45	91.12	18.23	56.20
46	95.34	18.35	54.95
47	95.18	18.39	55.30

Table 111. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_5									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	48.94%	*47.27%*	*52.47%*	41.41%	*35.01%*	*45.81%*	81.18%	*77.80%*	*83.77%*
29	39.20%	*34.77%*	*41.67%*	32.87%	*30.37%*	*36.04%*	74.71%	*72.49%*	*77.25%*
30	42.83%	*39.91%*	*44.53%*	30.93%	*27.55%*	*33.38%*	75.22%	*70.52%*	*80.81%*
31	40.65%	*37.84%*	*44.14%*	31.11%	*28.32%*	*34.38%*	75.79%	*72.37%*	*79.79%*
32	43.69%	*41.83%*	*46.49%*	35.21%	*32.81%*	*40.40%*	76.82%	*74.74%*	*78.33%*
33	44.38%	*42.53%*	*47.23%*	36.19%	*33.40%*	*42.30%*	74.29%	*67.59%*	*78.08%*
34	41.34%	*39.70%*	*42.97%*	35.75%	*33.26%*	*37.42%*	77.69%	*70.93%*	*82.36%*
35	40.41%	*36.88%*	*42.76%*	33.44%	*31.70%*	*37.38%*	75.97%	*73.37%*	*78.81%*
36	43.67%	*40.28%*	*46.18%*	37.17%	*33.65%*	*40.81%*	77.81%	*73.14%*	*81.77%*
37	42.52%	*41.05%*	*45.74%*	34.09%	*31.81%*	*37.57%*	74.75%	*69.35%*	*79.71%*
38	27.41%	*26.14%*	*28.53%*	21.94%	*20.48%*	*22.96%*	58.80%	*55.36%*	*62.17%*
39	28.80%	*26.14%*	*31.03%*	22.27%	*19.07%*	*26.08%*	59.25%	*55.68%*	*62.24%*
40	29.00%	*26.91%*	*30.58%*	25.25%	*23.11%*	*26.93%*	62.39%	*60.18%*	*64.72%*
41	26.23%	*23.76%*	*28.19%*	21.26%	*19.50%*	*22.70%*	60.87%	*57.97%*	*64.81%*
42	29.87%	*28.71%*	*31.27%*	22.35%	*20.29%*	*23.89%*	59.73%	*55.35%*	*63.07%*
43	30.52%	*29.25%*	*33.23%*	24.10%	*22.77%*	*26.46%*	62.11%	*60.95%*	*63.87%*
44	28.62%	*25.79%*	*32.98%*	22.03%	*19.72%*	*26.78%*	58.46%	*56.31%*	*60.25%*
45	28.28%	*27.25%*	*30.66%*	23.40%	*18.74%*	*26.13%*	60.33%	*57.80%*	*63.07%*
46	30.65%	*29.13%*	*32.88%*	24.07%	*21.90%*	*27.52%*	58.23%	*54.11%*	*64.09%*
47	31.62%	*26.86%*	*35.11%*	23.50%	*21.05%*	*25.45%*	63.17%	*60.88%*	*65.94%*

Table 112. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_5																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	-	-	-	-	-	-	-	-	-	-	-	-	832	1157	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	1232	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	1078	1488	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	1141	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	1216	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	1234	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	1141	1272	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	1188	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	1017	966	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	1148	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 113. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

FR_LIN_5			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	61.30	12.41	34.82
29	62.03	12.26	35.09
30	61.95	12.32	35.13
31	62.04	12.23	34.86
32	60.64	12.29	34.90
33	61.85	11.94	35.18
34	61.00	12.45	34.85
35	62.06	12.48	35.77
36	61.27	12.47	35.82
37	62.45	12.49	35.40
38	127.31	25.27	73.33
39	125.88	24.36	71.29
40	120.22	23.88	72.39
41	119.98	23.86	72.79
42	121.40	24.07	71.22
43	120.79	23.95	71.95
44	120.40	23.80	72.76
45	121.85	23.95	73.60
46	126.90	25.19	71.30
47	128.33	24.26	71.40

Table 114. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_7									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	61.95%	*58.98%*	*63.84%*	53.93%	*49.77%*	*56.78%*	86.92%	*86.37%*	*87.75%*
29	52.28%	*49.93%*	*56.13%*	45.29%	*42.40%*	*48.05%*	84.05%	*82.70%*	*84.82%*
30	54.20%	*51.95%*	*55.87%*	45.20%	*42.06%*	*47.20%*	78.84%	*74.74%*	*82.69%*
31	55.36%	*52.55%*	*57.55%*	44.62%	*42.67%*	*46.98%*	82.84%	*80.00%*	*85.27%*
32	58.52%	*56.15%*	*65.13%*	49.13%	*46.03%*	*53.04%*	81.08%	*77.94%*	*86.00%*
33	59.10%	*56.95%*	*61.02%*	48.07%	*44.08%*	*53.12%*	83.66%	*82.41%*	*84.41%*
34	56.53%	*54.46%*	*60.81%*	48.91%	*47.78%*	*50.07%*	85.19%	*82.87%*	*86.92%*
35	57.37%	*55.55%*	*59.21%*	46.40%	*43.62%*	*48.07%*	82.68%	*81.69%*	*84.61%*
36	57.45%	*54.73%*	*60.24%*	49.67%	*46.32%*	*54.57%*	84.66%	*83.54%*	*85.95%*
37	56.00%	*54.04%*	*59.93%*	49.30%	*44.75%*	*55.12%*	83.56%	*81.33%*	*85.76%*
38	39.68%	*37.85%*	*41.85%*	31.82%	*28.84%*	*34.91%*	68.81%	*66.08%*	*70.97%*
39	41.51%	*38.34%*	*44.93%*	30.96%	*28.31%*	*32.79%*	67.82%	*65.74%*	*70.33%*
40	41.81%	*39.68%*	*43.63%*	34.61%	*30.22%*	*38.43%*	71.45%	*70.41%*	*73.61%*
41	41.08%	*38.23%*	*45.14%*	33.18%	*30.95%*	*35.16%*	68.66%	*65.92%*	*70.75%*
42	43.62%	*40.83%*	*46.58%*	33.89%	*31.86%*	*36.31%*	68.40%	*66.36%*	*69.39%*
43	44.45%	*43.15%*	*46.88%*	35.29%	*33.34%*	*37.29%*	70.36%	*68.93%*	*71.65%*
44	39.74%	*36.81%*	*41.67%*	32.16%	*31.22%*	*33.02%*	69.78%	*67.38%*	*71.81%*
45	42.27%	*39.96%*	*44.14%*	35.23%	*33.03%*	*37.86%*	68.51%	*64.37%*	*73.44%*
46	43.13%	*40.07%*	*46.07%*	33.77%	*31.40%*	*37.66%*	67.08%	*64.65%*	*68.94%*
47	43.85%	*41.59%*	*46.60%*	38.27%	*36.46%*	*40.74%*	71.70%	*69.23%*	*76.01%*

Table 115. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_7																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	-	-	-	-	-	-	-	-	-	-	-	-	587	803	1259	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	715	978	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	974	1161	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	855	1167	1411	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	842	1257	1449	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	686	994	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	647	1031	1384	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	841	1140	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	613	865	1322	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	831	1146	1400	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	1384	-	-	-	-	-

Table 116. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

FR_LIN_7			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	61.10	12.34	35.12
29	62.07	12.15	35.27
30	58.88	11.80	35.15
31	59.00	12.21	35.13
32	59.46	11.80	35.13
33	59.01	12.46	35.16
34	62.40	12.30	35.20
35	61.70	11.80	35.88
36	58.63	11.81	35.07
37	58.61	11.80	35.47
38	120.89	23.90	72.30
39	127.21	25.23	71.76
40	124.50	25.00	71.42
41	125.40	24.72	71.45
42	125.70	25.07	72.84
43	127.98	23.88	71.72
44	121.62	23.94	72.05
45	125.49	24.41	73.21
46	126.27	24.93	74.74
47	120.79	23.95	73.66

Table 117. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_10									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	73.02%	*70.91%*	*74.80%*	65.29%	*62.77%*	*68.33%*	90.16%	*88.37%*	*91.67%*
29	68.63%	*66.82%*	*70.41%*	55.57%	*53.38%*	*56.99%*	87.61%	*84.37%*	*89.26%*
30	69.29%	*67.62%*	*70.63%*	53.58%	*47.09%*	*59.01%*	86.82%	*84.45%*	*88.99%*
31	70.41%	*67.79%*	*73.43%*	55.38%	*50.45%*	*62.26%*	81.77%	*80.22%*	*83.67%*
32	70.34%	*69.67%*	*71.08%*	60.41%	*55.24%*	*65.07%*	86.07%	*84.61%*	*88.40%*
33	72.56%	*66.55%*	*75.93%*	58.90%	*55.74%*	*60.78%*	87.39%	*85.44%*	*88.62%*
34	69.46%	*66.94%*	*71.69%*	60.90%	*58.64%*	*65.66%*	86.83%	*85.30%*	*88.14%*
35	69.47%	*68.16%*	*71.80%*	59.28%	*55.31%*	*62.51%*	85.82%	*83.47%*	*86.84%*
36	70.23%	*68.66%*	*73.40%*	60.06%	*57.65%*	*64.89%*	87.15%	*85.49%*	*88.70%*
37	69.50%	*66.22%*	*71.86%*	58.18%	*55.93%*	*63.25%*	87.11%	*85.54%*	*89.58%*
38	53.10%	*51.11%*	*54.90%*	42.13%	*39.22%*	*43.70%*	73.92%	*72.28%*	*75.60%*
39	53.98%	*51.88%*	*55.66%*	44.59%	*42.08%*	*47.53%*	73.53%	*70.46%*	*75.45%*
40	56.02%	*55.45%*	*56.52%*	45.66%	*43.00%*	*49.09%*	75.77%	*74.30%*	*76.74%*
41	54.72%	*52.97%*	*56.57%*	43.15%	*38.64%*	*48.02%*	74.94%	*72.40%*	*77.81%*
42	58.20%	*55.15%*	*59.90%*	45.29%	*41.74%*	*49.23%*	74.66%	*71.72%*	*77.12%*
43	56.22%	*54.63%*	*58.90%*	46.68%	*40.94%*	*50.22%*	73.90%	*72.91%*	*74.88%*
44	55.12%	*52.11%*	*58.42%*	43.88%	*42.48%*	*47.47%*	72.91%	*70.81%*	*73.72%*
45	57.06%	*53.68%*	*60.04%*	46.09%	*42.58%*	*49.36%*	74.58%	*73.70%*	*75.05%*
46	57.88%	*56.89%*	*58.96%*	44.77%	*41.06%*	*47.46%*	74.14%	*70.94%*	*77.10%*
47	59.83%	*57.88%*	*61.81%*	47.79%	*46.60%*	*49.91%*	77.81%	*75.60%*	*80.83%*

Table 118. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_10																						
	population 500						**population 100**															
case #	**500 generations**						**500 generations**						**1500 generations**									
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%				
28	-	-	-	-	-	-	-	-	-	-	-	-	427	598	965	1288	-	-				
29	-	-	-	-	-	-	-	-	-	-	-	-	619	837	1119	-	-	-				
30	-	-	-	-	-	-	-	-	-	-	-	-	653	920	1275	-	-	-				
31	-	-	-	-	-	-	-	-	-	-	-	-	794	1242	-	-	-	-				
32	-	-	-	-	-	-	-	-	-	-	-	-	586	837	1188	-	-	-				
33	347	-	-	-	-	-	-	-	-	-	-	-	608	834	1180	-	-	-				
34	-	-	-	-	-	-	-	-	-	-	-	-	547	773	1227	-	-	-				
35	-	-	-	-	-	-	-	-	-	-	-	-	632	919	1277	-	-	-				
36	-	-	-	-	-	-	-	-	-	-	-	-	547	853	1261	-	-	-				
37	-	-	-	-	-	-	-	-	-	-	-	-	670	925	1259	-	-	-				
38	-	-	-	-	-	-	-	-	-	-	-	-	1464	-	-	-	-	-				
39	-	-	-	-	-	-	-	-	-	-	-	-	1385	-	-	-	-	-				
40	-	-	-	-	-	-	-	-	-	-	-	-	1351	-	-	-	-	-				
41	-	-	-	-	-	-	-	-	-	-	-	-	1383	-	-	-	-	-				
42	-	-	-	-	-	-	-	-	-	-	-	-	1357	-	-	-	-	-				
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
45	-	-	-	-	-	-	-	-	-	-	-	-	1366	-	-	-	-	-				
46	-	-	-	-	-	-	-	-	-	-	-	-	1325	-	-	-	-	-				
47	-	-	-	-	-	-	-	-	-	-	-	-	1260	1424	-	-	-	-				

Table 119. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

FR_LIN_10			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	62.56	12.58	35.88
29	60.38	12.63	35.71
30	60.65	12.51	36.18
31	62.59	12.65	35.74
32	62.73	11.95	36.12
33	59.52	11.99	36.66
34	59.54	12.25	36.65
35	59.97	12.08	35.50
36	59.37	11.92	35.33
37	59.44	11.97	35.57
38	123.12	24.64	72.74
39	122.52	24.29	72.26
40	121.72	24.24	71.95
41	122.10	24.29	71.83
42	123.01	24.38	72.10
43	122.31	24.32	72.08
44	122.33	24.31	72.23
45	122.37	24.31	71.97
46	122.81	24.23	72.18
47	124.99	25.46	72.12

Table 120. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_20									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	84.02%	*81.50%*	*87.45%*	67.47%	*64.46%*	*76.01%*	90.85%	*88.46%*	*95.21%*
29	83.46%	*80.92%*	*84.54%*	65.62%	*61.87%*	*70.44%*	87.18%	*84.86%*	*88.80%*
30	77.73%	*76.41%*	*78.80%*	64.67%	*61.38%*	*71.55%*	86.58%	*82.44%*	*89.51%*
31	79.24%	*76.57%*	*82.12%*	64.12%	*60.44%*	*69.53%*	86.63%	*84.47%*	*88.33%*
32	81.64%	*79.68%*	*83.18%*	66.29%	*60.91%*	*71.86%*	89.82%	*87.74%*	*92.51%*
33	83.88%	*80.95%*	*87.02%*	66.61%	*62.12%*	*73.69%*	87.77%	*86.01%*	*88.83%*
34	82.07%	*80.11%*	*85.62%*	66.83%	*62.66%*	*68.92%*	87.56%	*81.78%*	*91.60%*
35	81.40%	*79.15%*	*84.09%*	64.40%	*62.13%*	*68.15%*	85.99%	*84.28%*	*88.51%*
36	81.57%	*80.07%*	*82.92%*	66.56%	*65.32%*	*67.86%*	89.05%	*86.48%*	*93.01%*
37	80.48%	*78.35%*	*82.72%*	64.04%	*61.54%*	*65.55%*	87.57%	*84.72%*	*90.67%*
38	71.84%	*68.44%*	*73.92%*	52.74%	*49.21%*	*56.00%*	76.53%	*73.47%*	*79.04%*
39	72.78%	*70.69%*	*74.46%*	49.88%	*47.99%*	*54.14%*	75.36%	*71.29%*	*79.64%*
40	70.17%	*66.24%*	*75.18%*	56.09%	*55.04%*	*57.15%*	77.28%	*76.63%*	*78.92%*
41	73.87%	*69.37%*	*76.57%*	51.16%	*48.50%*	*54.63%*	77.54%	*72.90%*	*81.80%*
42	73.17%	*69.88%*	*75.45%*	53.18%	*46.64%*	*58.83%*	78.05%	*76.96%*	*78.77%*
43	73.91%	*71.16%*	*76.19%*	52.94%	*48.99%*	*55.62%*	77.79%	*76.58%*	*79.41%*
44	70.83%	*68.70%*	*76.08%*	53.00%	*48.86%*	*56.46%*	77.06%	*75.28%*	*78.45%*
45	74.14%	*70.37%*	*75.63%*	52.91%	*50.09%*	*54.81%*	76.62%	*74.62%*	*77.82%*
46	73.98%	*71.77%*	*78.46%*	53.43%	*45.90%*	*60.11%*	75.76%	*73.79%*	*78.63%*
47	74.85%	*73.58%*	*76.91%*	57.80%	*55.92%*	*59.83%*	80.10%	*79.01%*	*81.15%*

Table 121. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

FR_LIN_20																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	151	295	251	-	-	-	496	-	-	-	-	-	289	489	755	1205	1478	-
29	166	308	-	-	-	-	-	-	-	-	-	-	575	777	1075	-	-	-
30	319	-	-	-	-	-	-	-	-	-	-	-	615	899	1178	-	-	-
31	258	401	-	-	-	-	-	-	-	-	-	-	607	810	1266	-	-	-
32	201	432	-	-	-	-	-	-	-	-	-	-	565	752	1023	1222	-	-
33	203	341	414	-	-	-	-	-	-	-	-	-	518	784	1149	-	-	-
34	194	358	496	-	-	-	-	-	-	-	-	-	627	834	1053	1208	-	-
35	233	340	-	-	-	-	-	-	-	-	-	-	577	868	1383	-	-	-
36	178	341	-	-	-	-	-	-	-	-	-	-	451	609	934	982	-	-
37	223	301	-	-	-	-	-	-	-	-	-	-	615	836	1070	1433	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	1343	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	1165	-	-	-	-	-
40	457	-	-	-	-	-	-	-	-	-	-	-	1264	-	-	-	-	-
41	477	-	-	-	-	-	-	-	-	-	-	-	1175	1313	-	-	-	-
42	469	-	-	-	-	-	-	-	-	-	-	-	1202	-	-	-	-	-
43	383	-	-	-	-	-	-	-	-	-	-	-	1157	-	-	-	-	-
44	474	-	-	-	-	-	-	-	-	-	-	-	1292	-	-	-	-	-
45	464	-	-	-	-	-	-	-	-	-	-	-	1291	-	-	-	-	-
46	317	-	-	-	-	-	-	-	-	-	-	-	1224	-	-	-	-	-
47	461	-	-	-	-	-	-	-	-	-	-	-	1031	1342	-	-	-	-

Table 122. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

FR_LIN_20			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	62.33	12.14	36.51
29	63.03	12.18	36.14
30	59.91	12.58	36.55
31	59.96	12.12	36.46
32	60.05	12.29	36.34
33	62.76	12.74	36.21
34	61.22	12.83	36.12
35	63.65	12.74	36.31
36	61.11	12.30	35.71
37	60.00	12.10	36.00
38	123.26	24.55	73.02
39	129.44	25.29	72.76
40	130.17	26.15	72.68
41	128.81	26.23	72.86
42	130.81	26.18	72.97
43	131.56	26.01	73.74
44	130.28	26.14	74.63
45	132.31	26.01	73.66
46	130.80	25.70	73.53
47	130.96	26.09	74.72

Table 123. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_5									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	94.77%	*92.85%*	*96.00%*	79.82%	*75.04%*	*82.51%*	92.76%	*90.75%*	*94.43%*
29	91.99%	*90.33%*	*94.63%*	75.96%	*74.19%*	*78.34%*	90.39%	*88.04%*	*92.84%*
30	91.22%	*89.48%*	*93.37%*	74.41%	*72.95%*	*76.96%*	88.42%	*86.71%*	*91.46%*
31	89.98%	*86.83%*	*91.20%*	72.62%	*70.58%*	*76.20%*	86.61%	*85.35%*	*88.70%*
32	93.87%	*92.22%*	*95.75%*	75.03%	*72.45%*	*77.25%*	90.96%	*89.12%*	*93.59%*
33	91.86%	*89.00%*	*94.09%*	75.87%	*72.85%*	*79.19%*	90.45%	*86.48%*	*93.71%*
34	91.05%	*89.28%*	*92.19%*	75.61%	*71.64%*	*78.77%*	88.60%	*86.94%*	*90.66%*
35	92.83%	*89.65%*	*95.02%*	75.79%	*70.98%*	*79.14%*	91.38%	*89.73%*	*92.17%*
36	91.22%	*88.58%*	*92.87%*	76.43%	*73.51%*	*79.03%*	90.61%	*89.28%*	*92.34%*
37	92.31%	*91.30%*	*94.74%*	75.72%	*73.78%*	*77.79%*	90.97%	*89.07%*	*94.44%*
38	81.55%	*78.70%*	*83.37%*	65.19%	*61.99%*	*67.48%*	82.15%	*77.99%*	*87.41%*
39	82.41%	*79.80%*	*85.42%*	62.56%	*57.84%*	*65.58%*	79.95%	*76.84%*	*83.36%*
40	82.99%	*81.04%*	*85.64%*	61.85%	*60.40%*	*63.19%*	81.71%	*80.07%*	*83.16%*
41	83.55%	*81.41%*	*85.32%*	64.96%	*61.25%*	*69.48%*	81.15%	*77.63%*	*82.67%*
42	84.88%	*82.40%*	*87.43%*	63.13%	*60.87%*	*64.68%*	80.82%	*78.24%*	*83.34%*
43	83.68%	*80.89%*	*85.75%*	63.09%	*60.86%*	*66.59%*	80.73%	*78.72%*	*82.10%*
44	82.52%	*81.19%*	*83.42%*	63.22%	*62.02%*	*65.14%*	79.98%	*76.46%*	*82.33%*
45	82.80%	*80.87%*	*85.55%*	62.74%	*59.44%*	*66.02%*	81.56%	*75.72%*	*85.02%*
46	84.05%	*82.46%*	*85.78%*	63.73%	*62.18%*	*65.19%*	78.66%	*75.31%*	*84.17%*
47	84.65%	*83.01%*	*85.95%*	64.56%	*61.68%*	*67.40%*	83.67%	*82.96%*	*85.65%*

Table 124. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_5																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	165	197	234	317	449	-	368	467	-	-	-	-	301	444	645	1070	-	-
29	173	200	247	403	-	-	380	-	-	-	-	-	469	656	963	1305	-	-
30	202	228	335	442	-	-	434	-	-	-	-	-	506	636	924	1239	-	-
31	202	251	324	453	-	-	472	-	-	-	-	-	571	842	1262	-	-	-
32	175	196	229	336	484	-	451	-	-	-	-	-	428	553	934	1314	-	-
33	177	213	290	318	-	-	436	-	-	-	-	-	353	495	840	1112	-	-
34	180	206	280	427	-	-	409	-	-	-	-	-	405	614	1005	1406	-	-
35	173	195	261	375	497	-	391	-	-	-	-	-	400	563	833	1133	-	-
36	180	214	280	431	-	-	364	-	-	-	-	-	375	538	875	1224	-	-
37	169	206	263	385	-	-	413	-	-	-	-	-	433	619	894	1295	-	-
38	314	420	-	-	-	-	-	-	-	-	-	-	1021	1122	1276	-	-	-
39	289	379	487	-	-	-	-	-	-	-	-	-	1145	1312	-	-	-	-
40	298	393	477	-	-	-	-	-	-	-	-	-	813	1196	-	-	-	-
41	293	378	473	-	-	-	-	-	-	-	-	-	940	1346	-	-	-	-
42	267	358	481	-	-	-	-	-	-	-	-	-	879	1290	-	-	-	-
43	301	386	466	-	-	-	-	-	-	-	-	-	921	1312	-	-	-	-
44	332	424	-	-	-	-	-	-	-	-	-	-	1013	1197	-	-	-	-
45	293	390	495	-	-	-	-	-	-	-	-	-	978	1219	1486	-	-	-
46	300	378	473	-	-	-	-	-	-	-	-	-	1189	1332	-	-	-	-
47	263	360	482	-	-	-	-	-	-	-	-	-	803	1144	1445	-	-	-

Table 125. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

OQ_LIN_5			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	48.53	9.63	27.98
29	48.26	9.61	28.15
30	48.82	9.82	27.93
31	48.87	10.16	27.76
32	51.16	9.68	28.02
33	48.01	9.82	27.81
34	50.48	10.12	28.09
35	51.90	10.12	28.21
36	51.26	9.95	27.89
37	49.03	9.82	28.18
38	99.27	19.16	55.96
39	95.39	18.96	55.69
40	94.20	18.96	55.64
41	94.67	18.93	56.86
42	96.50	18.94	55.66
43	96.00	19.20	55.85
44	96.17	20.03	56.05
45	97.55	19.94	55.84
46	101.70	20.06	56.27
47	102.08	19.98	55.92

Table 126. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_7									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	94.29%	*92.58%*	*95.53%*	80.81%	*76.08%*	*83.98%*	93.94%	*92.68%*	*94.90%*
29	92.96%	*90.78%*	*93.71%*	79.52%	*76.46%*	*81.82%*	90.03%	*88.27%*	*91.78%*
30	91.04%	*89.63%*	*92.67%*	76.39%	*72.75%*	*82.08%*	90.37%	*89.31%*	*91.86%*
31	91.05%	*88.57%*	*92.73%*	75.51%	*69.96%*	*78.76%*	88.26%	*85.29%*	*90.96%*
32	93.14%	*91.80%*	*93.96%*	77.05%	*74.84%*	*80.17%*	91.42%	*90.29%*	*92.82%*
33	89.30%	*87.73%*	*92.47%*	76.86%	*74.58%*	*81.06%*	90.37%	*87.51%*	*93.03%*
34	91.94%	*91.29%*	*93.05%*	75.67%	*72.96%*	*76.90%*	91.63%	*88.25%*	*95.49%*
35	93.56%	*91.75%*	*96.02%*	77.16%	*76.08%*	*77.62%*	90.50%	*89.23%*	*91.93%*
36	93.43%	*92.02%*	*94.93%*	77.33%	*73.78%*	*80.22%*	89.82%	*87.80%*	*92.52%*
37	93.86%	*92.92%*	*95.07%*	77.35%	*73.89%*	*79.38%*	91.82%	*89.39%*	*94.76%*
38	84.15%	*81.79%*	*86.46%*	63.43%	*62.04%*	*66.50%*	80.04%	*78.03%*	*82.70%*
39	82.34%	*81.45%*	*83.59%*	62.73%	*59.15%*	*66.41%*	80.37%	*78.68%*	*82.58%*
40	84.44%	*82.86%*	*86.46%*	66.72%	*62.84%*	*71.62%*	82.63%	*80.11%*	*83.80%*
41	85.17%	*83.06%*	*87.62%*	65.63%	*61.35%*	*69.61%*	81.98%	*78.45%*	*85.83%*
42	84.72%	*83.69%*	*85.41%*	64.21%	*61.57%*	*67.25%*	82.25%	*80.81%*	*84.76%*
43	84.22%	*83.68%*	*85.14%*	65.17%	*60.94%*	*69.64%*	80.33%	*78.76%*	*82.24%*
44	85.39%	*82.22%*	*89.40%*	64.12%	*59.89%*	*67.90%*	80.84%	*77.21%*	*82.61%*
45	83.55%	*81.11%*	*87.00%*	65.17%	*63.06%*	*67.93%*	80.32%	*77.87%*	*81.49%*
46	83.71%	*82.93%*	*84.70%*	63.55%	*61.10%*	*65.84%*	80.69%	*79.66%*	*81.56%*
47	85.26%	*81.89%*	*87.16%*	65.51%	*63.13%*	*68.29%*	82.90%	*80.30%*	*85.12%*

Table 127. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_7																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	118	139	174	297	461	-	314	430	-	-	-	-	295	384	654	915	-	-
29	130	160	223	338	-	-	372	440	-	-	-	-	459	608	921	1267	-	-
30	144	188	269	431	-	-	441	429	-	-	-	-	464	677	934	1324	-	-
31	134	158	242	400	-	-	414	-	-	-	-	-	465	707	1150	1419	-	-
32	128	163	241	357	501	-	439	499	-	-	-	-	395	519	848	1304	-	-
33	156	208	325	358	-	-	403	486	-	-	-	-	425	593	862	1234	-	-
34	129	157	217	375	-	-	453	-	-	-	-	-	448	607	864	1244	1428	-
35	132	160	227	333	443	-	434	-	-	-	-	-	389	579	842	1372	-	-
36	130	160	217	336	-	-	399	483	-	-	-	-	411	575	905	1215	-	-
37	122	149	217	329	474	-	378	-	-	-	-	-	448	624	844	1250	-	-
38	232	352	478	-	-	-	-	-	-	-	-	-	1043	1315	-	-	-	-
39	274	407	-	-	-	-	-	-	-	-	-	-	1028	1276	-	-	-	-
40	245	355	438	-	-	-	-	-	-	-	-	-	789	1207	-	-	-	-
41	235	318	415	-	-	-	-	-	-	-	-	-	1000	1194	1380	-	-	-
42	240	362	478	-	-	-	-	-	-	-	-	-	906	1313	-	-	-	-
43	254	369	474	-	-	-	-	-	-	-	-	-	960	1363	-	-	-	-
44	265	355	443	-	-	-	-	-	-	-	-	-	1060	1272	-	-	-	-
45	237	371	455	-	-	-	-	-	-	-	-	-	989	1433	-	-	-	-
46	241	342	-	-	-	-	-	-	-	-	-	-	871	1216	-	-	-	-
47	207	275	437	-	-	-	-	-	-	-	-	-	769	1179	1464	-	-	-

Table 128. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

OQ_LIN_7			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	49.19	9.62	28.30
29	49.59	9.76	27.87
30	49.96	9.69	28.02
31	49.39	9.74	28.97
32	50.28	9.94	28.26
33	52.04	10.17	27.88
34	51.44	10.22	28.64
35	52.42	10.15	28.46
36	53.70	10.28	28.03
37	50.08	9.89	28.03
38	98.33	19.28	56.09
39	98.31	19.45	57.84
40	97.82	19.14	56.44
41	97.85	19.73	56.03
42	103.40	19.42	57.01
43	99.46	19.20	58.28
44	97.75	19.20	56.76
45	99.87	20.62	57.14
46	102.02	19.84	56.07
47	103.38	19.97	55.97

Table 129. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_10									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	96.55%	*95.44%*	*97.26%*	81.86%	*80.47%*	*83.11%*	95.13%	*92.97%*	*96.83%*
29	93.98%	*91.65%*	*96.13%*	76.98%	*75.42%*	*78.87%*	90.35%	*88.43%*	*92.10%*
30	92.04%	*90.93%*	*93.83%*	75.70%	*69.92%*	*81.47%*	90.22%	*86.37%*	*93.73%*
31	91.10%	*89.20%*	*91.82%*	76.37%	*74.75%*	*78.81%*	88.57%	*83.26%*	*90.50%*
32	94.20%	*92.03%*	*95.71%*	79.28%	*74.16%*	*81.83%*	90.15%	*86.55%*	*92.32%*
33	92.88%	*90.77%*	*94.41%*	79.41%	*74.97%*	*84.06%*	90.24%	*88.30%*	*92.17%*
34	92.96%	*90.81%*	*95.35%*	79.53%	*76.67%*	*82.07%*	90.14%	*88.51%*	*91.00%*
35	92.54%	*90.44%*	*94.39%*	77.58%	*75.66%*	*79.30%*	91.32%	*88.97%*	*94.14%*
36	94.17%	*93.29%*	*96.22%*	79.15%	*75.16%*	*81.77%*	92.27%	*89.69%*	*94.43%*
37	93.98%	*91.16%*	*96.15%*	76.18%	*72.04%*	*81.20%*	90.88%	*89.13%*	*92.31%*
38	84.45%	*81.76%*	*86.59%*	66.36%	*63.93%*	*69.10%*	81.84%	*79.10%*	*84.07%*
39	84.92%	*84.27%*	*86.34%*	62.98%	*58.14%*	*65.04%*	79.83%	*78.20%*	*82.27%*
40	86.00%	*83.88%*	*88.27%*	64.27%	*63.15%*	*65.42%*	83.62%	*82.47%*	*85.54%*
41	85.56%	*82.67%*	*87.17%*	67.17%	*66.19%*	*68.37%*	82.58%	*79.48%*	*86.08%*
42	83.97%	*81.25%*	*85.15%*	67.09%	*65.04%*	*69.85%*	82.05%	*78.16%*	*84.80%*
43	84.83%	*81.71%*	*87.35%*	65.49%	*62.88%*	*69.25%*	81.48%	*79.62%*	*83.33%*
44	84.57%	*82.02%*	*86.18%*	65.15%	*63.25%*	*67.17%*	80.08%	*77.52%*	*82.54%*
45	85.52%	*81.10%*	*87.86%*	66.83%	*64.19%*	*69.25%*	82.70%	*81.07%*	*84.24%*
46	84.38%	*82.56%*	*85.42%*	64.37%	*60.07%*	*67.41%*	82.20%	*79.68%*	*85.50%*
47	85.94%	*85.05%*	*87.23%*	66.78%	*65.95%*	*67.83%*	83.36%	*80.52%*	*85.99%*

Table 130. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

OQ_LIN_10																						
	population 500						**population 100**															
case #	**500 generations**						**500 generations**						**1500 generations**									
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%				
28	100	120	157	231	383	-	299	432	-	-	-	-	321	507	725	976	1267	-				
29	119	137	210	316	471	-	414	-	-	-	-	-	434	614	959	1395	-	-				
30	128	164	259	402	-	-	395	421	-	-	-	-	452	631	993	1169	-	-				
31	127	176	273	419	-	-	444	-	-	-	-	-	502	779	1015	1467	-	-				
32	111	146	186	304	414	-	343	485	-	-	-	-	398	576	863	1272	-	-				
33	112	138	199	343	-	-	361	424	-	-	-	-	421	563	763	1284	-	-				
34	118	151	203	344	490	-	356	450	-	-	-	-	361	523	773	1408	-	-				
35	110	152	222	363	-	-	425	-	-	-	-	-	415	593	790	1181	-	-				
36	114	149	212	308	331	-	350	439	-	-	-	-	387	537	806	1091	-	-				
37	107	135	184	282	465	-	430	463	-	-	-	-	415	585	841	1325	-	-				
38	248	352	456	-	-	-	-	-	-	-	-	-	949	1295	-	-	-	-				
39	248	339	453	-	-	-	-	-	-	-	-	-	1020	1395	-	-	-	-				
40	215	308	443	-	-	-	-	-	-	-	-	-	825	1198	1421	-	-	-				
41	226	326	408	-	-	-	-	-	-	-	-	-	942	1240	1465	-	-	-				
42	236	359	485	-	-	-	-	-	-	-	-	-	949	1213	-	-	-	-				
43	263	378	445	-	-	-	-	-	-	-	-	-	940	1367	-	-	-	-				
44	260	375	457	-	-	-	-	-	-	-	-	-	993	1342	-	-	-	-				
45	218	344	465	-	-	-	-	-	-	-	-	-	871	1137	-	-	-	-				
46	223	327	478	-	-	-	-	-	-	-	-	-	953	1272	1421	-	-	-				
47	203	308	456	-	-	-	-	-	-	-	-	-	801	1204	1410	-	-	-				

Table 131. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

OQ_LIN_10			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	52.45	10.56	27.92
29	53.85	10.58	27.92
30	55.00	10.45	28.10
31	54.62	10.47	28.30
32	53.87	10.47	29.14
33	54.04	10.35	29.07
34	52.18	10.54	28.35
35	53.42	9.95	28.26
36	51.80	10.32	27.90
37	51.64	10.35	27.92
38	102.39	19.94	56.07
39	103.09	19.51	55.79
40	100.86	19.64	56.19
41	101.63	19.67	56.38
42	102.35	20.38	55.85
43	104.12	19.73	57.89
44	100.71	19.66	57.60
45	101.80	19.56	57.31
46	102.27	19.67	56.26
47	101.89	19.54	56.11

Table 132. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ORDER_LIN									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	96.12%	*94.22%*	*97.26%*	83.40%	*80.66%*	*87.87%*	93.51%	*89.42%*	*96.10%*
29	93.52%	*91.33%*	*95.21%*	80.63%	*78.32%*	*84.56%*	91.45%	*90.55%*	*92.64%*
30	93.42%	*89.27%*	*96.56%*	75.69%	*72.69%*	*80.76%*	89.23%	*88.86%*	*89.63%*
31	91.20%	*89.19%*	*93.31%*	74.20%	*71.54%*	*77.58%*	88.94%	*86.23%*	*91.84%*
32	93.45%	*91.19%*	*94.91%*	77.71%	*74.23%*	*80.82%*	91.42%	*91.01%*	*92.43%*
33	92.53%	*89.82%*	*94.72%*	77.53%	*76.22%*	*78.36%*	90.92%	*89.44%*	*92.55%*
34	93.33%	*92.27%*	*94.37%*	78.73%	*77.30%*	*81.03%*	90.20%	*89.09%*	*91.67%*
35	94.25%	*91.86%*	*96.16%*	78.74%	*73.99%*	*83.27%*	90.26%	*88.32%*	*92.28%*
36	93.53%	*91.57%*	*94.96%*	80.86%	*77.52%*	*85.35%*	91.63%	*90.18%*	*93.14%*
37	92.98%	*91.89%*	*94.60%*	77.98%	*75.28%*	*81.03%*	92.01%	*90.10%*	*94.81%*
38	84.92%	*82.91%*	*86.74%*	65.79%	*64.06%*	*68.37%*	81.95%	*78.75%*	*85.55%*
39	83.63%	*82.32%*	*84.41%*	65.52%	*64.05%*	*69.83%*	79.14%	*77.81%*	*80.95%*
40	85.43%	*83.34%*	*88.21%*	65.91%	*64.60%*	*66.97%*	82.97%	*80.37%*	*85.90%*
41	85.78%	*84.67%*	*86.95%*	65.73%	*62.17%*	*72.26%*	82.78%	*79.72%*	*85.96%*
42	84.29%	*80.79%*	*86.40%*	67.32%	*62.04%*	*71.25%*	81.59%	*79.05%*	*83.00%*
43	85.10%	*84.02%*	*86.27%*	65.81%	*62.24%*	*71.02%*	81.21%	*79.00%*	*83.16%*
44	86.34%	*84.26%*	*89.03%*	65.49%	*64.03%*	*67.38%*	82.72%	*81.15%*	*85.51%*
45	84.65%	*83.46%*	*85.62%*	66.57%	*63.60%*	*73.12%*	81.11%	*79.23%*	*82.02%*
46	83.19%	*81.09%*	*84.30%*	66.05%	*65.01%*	*67.02%*	81.16%	*77.00%*	*83.28%*
47	85.08%	*83.54%*	*86.32%*	69.85%	*67.29%*	*73.04%*	83.81%	*82.30%*	*85.78%*

Table 133. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ORDER_LIN																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	86	120	160	237	436	-	311	405	425	-	-	-	291	420	592	943	1180	-
29	101	132	192	305	465	-	370	445	-	-	-	-	368	517	742	1192	-	-
30	112	155	228	318	417	-	434	497	-	-	-	-	422	608	902	-	-	-
31	108	170	245	377	-	-	434	-	-	-	-	-	498	770	1163	1370	-	-
32	107	155	211	327	-	-	381	449	-	-	-	-	424	544	820	1216	-	-
33	116	155	227	340	-	-	423	-	-	-	-	-	375	540	903	1220	-	-
34	116	154	221	319	-	-	370	431	-	-	-	-	404	577	825	1371	-	-
35	104	152	218	317	458	-	370	437	-	-	-	-	405	555	758	1298	-	-
36	98	124	204	319	-	-	313	386	481	-	-	-	426	607	875	1266	-	-
37	117	168	243	362	-	-	421	440	-	-	-	-	462	572	766	1224	-	-
38	235	352	458	-	-	-	-	-	-	-	-	-	893	1271	1354	-	-	-
39	257	370	-	-	-	-	-	-	-	-	-	-	1046	1271	-	-	-	-
40	257	340	471	-	-	-	-	-	-	-	-	-	885	1259	1470	-	-	-
41	219	316	444	-	-	-	-	-	-	-	-	-	861	1128	1379	-	-	-
42	233	364	481	-	-	-	-	-	-	-	-	-	933	1243	-	-	-	-
43	234	322	475	-	-	-	-	-	-	-	-	-	959	1242	-	-	-	-
44	226	295	418	-	-	-	-	-	-	-	-	-	870	1232	1483	-	-	-
45	252	349	489	-	-	-	-	-	-	-	-	-	967	1270	-	-	-	-
46	256	375	-	-	-	-	-	-	-	-	-	-	942	1281	-	-	-	-
47	225	326	479	-	-	-	-	-	-	-	-	-	802	1094	1454	-	-	-

Table 134. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ORDER_LIN			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	54.31	10.48	27.93
29	51.83	10.12	28.12
30	51.14	9.76	28.93
31	51.13	9.76	28.11
32	51.01	10.47	28.04
33	52.51	9.78	27.81
34	50.98	9.79	27.93
35	50.83	9.84	27.98
36	51.60	9.82	28.97
37	51.56	9.84	28.05
38	102.41	19.39	56.10
39	102.39	20.47	56.26
40	108.35	20.66	56.23
41	106.72	20.40	57.62
42	105.92	19.98	58.12
43	101.98	19.53	56.74
44	102.15	19.64	56.24
45	102.78	20.39	56.19
46	103.75	19.58	56.45
47	103.56	19.71	56.23

Table 135. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ORDER_LOG									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	96.68%	*95.59%*	*97.76%*	81.02%	*77.37%*	*84.14%*	93.54%	*91.38%*	*95.11%*
29	94.39%	*92.62%*	*95.68%*	75.89%	*70.07%*	*79.47%*	91.03%	*89.89%*	*91.85%*
30	93.87%	*93.20%*	*94.98%*	78.20%	*76.75%*	*79.12%*	90.65%	*87.72%*	*92.84%*
31	91.96%	*89.51%*	*94.07%*	75.97%	*74.28%*	*79.37%*	87.54%	*83.72%*	*90.16%*
32	92.85%	*90.83%*	*94.40%*	79.94%	*79.29%*	*80.37%*	90.92%	*88.98%*	*91.82%*
33	92.51%	*91.34%*	*94.50%*	77.95%	*74.84%*	*82.93%*	91.28%	*89.56%*	*92.91%*
34	92.43%	*90.53%*	*94.24%*	76.37%	*71.41%*	*82.90%*	90.91%	*87.76%*	*93.53%*
35	93.25%	*91.30%*	*95.17%*	77.49%	*74.19%*	*80.79%*	93.01%	*90.45%*	*94.81%*
36	93.66%	*91.51%*	*95.44%*	80.70%	*78.17%*	*84.19%*	90.38%	*87.78%*	*91.89%*
37	92.67%	*90.92%*	*93.60%*	78.57%	*76.78%*	*80.83%*	91.99%	*90.10%*	*94.09%*
38	85.95%	*83.85%*	*88.20%*	64.40%	*60.92%*	*65.68%*	81.04%	*79.24%*	*82.52%*
39	83.55%	*82.37%*	*84.99%*	62.31%	*57.51%*	*65.39%*	80.34%	*78.54%*	*85.03%*
40	85.30%	*82.14%*	*89.19%*	66.98%	*66.03%*	*67.87%*	82.85%	*81.40%*	*84.07%*
41	87.18%	*85.69%*	*88.66%*	63.87%	*61.82%*	*66.81%*	83.89%	*81.40%*	*89.70%*
42	85.64%	*84.11%*	*87.24%*	66.74%	*63.23%*	*70.57%*	82.67%	*80.55%*	*87.56%*
43	84.41%	*83.14%*	*85.13%*	66.17%	*62.59%*	*68.69%*	82.31%	*80.48%*	*83.10%*
44	85.97%	*84.26%*	*88.27%*	65.16%	*61.78%*	*68.03%*	82.48%	*80.36%*	*84.46%*
45	85.45%	*83.48%*	*87.50%*	65.85%	*61.82%*	*68.20%*	80.98%	*79.36%*	*82.33%*
46	83.42%	*81.10%*	*85.88%*	66.59%	*61.55%*	*71.01%*	83.29%	*82.71%*	*84.18%*
47	85.51%	*84.17%*	*87.46%*	69.42%	*67.22%*	*70.77%*	84.60%	*83.61%*	*85.54%*

Table 136. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

ORDER_LOG																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	80	104	165	246	387	-	301	428	-	-	-	-	306	461	651	1041	1405	-
29	104	155	205	312	427	-	402	-	-	-	-	-	412	532	806	1273	-	-
30	106	157	234	315	500	-	382	-	-	-	-	-	389	532	898	1193	-	-
31	130	198	261	379	-	-	446	-	-	-	-	-	494	668	985	1496	-	-
32	107	137	191	331	-	-	402	495	-	-	-	-	415	579	857	1213	-	-
33	102	148	234	375	-	-	381	360	-	-	-	-	417	596	874	1299	-	-
34	118	173	250	391	-	-	375	369	-	-	-	-	404	535	825	1123	-	-
35	110	152	239	357	487	-	389	500	-	-	-	-	408	557	786	1171	-	-
36	101	136	194	348	462	-	356	384	-	-	-	-	333	485	777	1359	-	-
37	102	141	210	351	-	-	393	476	-	-	-	-	367	529	814	1248	-	-
38	230	311	444	-	-	-	-	-	-	-	-	-	905	1353	-	-	-	-
39	266	379	-	-	-	-	-	-	-	-	-	-	1050	1237	1492	-	-	-
40	237	342	432	-	-	-	-	-	-	-	-	-	874	1222	-	-	-	-
41	209	278	428	-	-	-	-	-	-	-	-	-	851	1124	1182	-	-	-
42	230	325	453	-	-	-	-	-	-	-	-	-	919	1284	1294	-	-	-
43	268	371	474	-	-	-	-	-	-	-	-	-	943	1298	-	-	-	-
44	233	322	444	-	-	-	-	-	-	-	-	-	968	1293	-	-	-	-
45	227	316	476	-	-	-	-	-	-	-	-	-	995	1365	-	-	-	-
46	257	372	482	-	-	-	-	-	-	-	-	-	933	1262	-	-	-	-
47	211	293	467	-	-	-	-	-	-	-	-	-	724	1059	1424	-	-	-

Table 137. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

ORDER_LOG			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	52.06	9.85	28.03
29	51.43	9.86	28.11
30	51.70	9.85	28.05
31	52.89	10.30	28.04
32	52.99	9.94	28.13
33	50.99	9.82	28.80
34	50.84	9.79	28.12
35	51.19	9.87	27.98
36	53.41	9.98	28.09
37	54.02	10.27	28.59
38	109.01	20.52	56.04
39	109.04	19.64	56.70
40	102.25	20.21	56.43
41	106.78	19.34	56.16
42	105.76	20.68	56.63
43	105.55	19.88	56.59
44	105.59	20.49	55.99
45	103.98	19.51	56.02
46	102.05	19.73	56.19
47	108.02	20.76	56.02

Table 138. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_10									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	95.97%	*94.89%*	*96.92%*	80.05%	*76.25%*	*83.96%*	93.83%	*92.17%*	*95.12%*
29	93.53%	*92.09%*	*95.50%*	75.22%	*73.02%*	*78.42%*	91.47%	*90.24%*	*92.56%*
30	93.09%	*91.19%*	*96.73%*	75.44%	*71.34%*	*79.28%*	89.87%	*87.19%*	*91.64%*
31	90.63%	*87.20%*	*92.65%*	75.07%	*71.49%*	*79.72%*	88.77%	*87.14%*	*90.47%*
32	94.01%	*92.27%*	*95.23%*	76.13%	*71.33%*	*78.71%*	91.12%	*89.35%*	*94.24%*
33	92.66%	*91.41%*	*93.64%*	74.64%	*69.30%*	*82.04%*	89.71%	*88.22%*	*93.28%*
34	92.95%	*91.90%*	*93.89%*	77.58%	*75.97%*	*80.52%*	89.78%	*87.47%*	*92.42%*
35	92.24%	*89.69%*	*94.83%*	76.57%	*73.14%*	*80.05%*	90.31%	*87.58%*	*92.24%*
36	93.35%	*90.73%*	*96.08%*	77.07%	*75.17%*	*78.90%*	90.37%	*89.57%*	*91.46%*
37	92.53%	*90.41%*	*94.96%*	74.52%	*72.51%*	*78.60%*	88.86%	*86.50%*	*91.57%*
38	84.76%	*83.37%*	*85.97%*	62.56%	*60.22%*	*66.20%*	80.90%	*79.36%*	*81.96%*
39	82.65%	*79.80%*	*85.98%*	61.04%	*58.92%*	*63.72%*	79.98%	*77.49%*	*82.20%*
40	84.29%	*82.96%*	*85.37%*	63.81%	*59.90%*	*67.57%*	81.67%	*78.52%*	*84.13%*
41	87.45%	*86.09%*	*88.87%*	62.39%	*60.71%*	*65.14%*	82.63%	*79.99%*	*84.88%*
42	83.06%	*79.74%*	*86.80%*	63.16%	*62.17%*	*65.23%*	81.00%	*77.82%*	*83.82%*
43	83.54%	*81.16%*	*88.08%*	63.51%	*61.69%*	*66.14%*	79.08%	*76.22%*	*81.70%*
44	84.28%	*81.67%*	*87.48%*	62.48%	*59.38%*	*65.43%*	81.34%	*78.64%*	*85.30%*
45	84.05%	*82.89%*	*85.45%*	63.58%	*59.08%*	*67.21%*	80.41%	*80.03%*	*80.87%*
46	84.26%	*81.50%*	*86.40%*	62.81%	*58.42%*	*67.33%*	79.81%	*76.82%*	*82.47%*
47	85.55%	*83.54%*	*87.38%*	65.89%	*64.42%*	*70.84%*	83.17%	*80.65%*	*85.23%*

Table 139. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_10																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	79	106	152	245	392	-	333	433	-	-	-	-	360	499	743	1044	1453	-
29	92	129	206	350	441	-	440	-	-	-	-	-	413	541	786	1255	-	-
30	94	133	205	337	372	-	438	-	-	-	-	-	491	677	1004	1353	-	-
31	104	150	234	370	-	-	485	-	-	-	-	-	530	786	1102	1452	-	-
32	98	141	220	313	490	-	419	-	-	-	-	-	455	581	780	1210	-	-
33	88	128	180	344	-	-	372	403	-	-	-	-	485	667	985	1250	-	-
34	98	134	205	297	-	-	443	471	-	-	-	-	416	605	898	1276	-	-
35	90	131	213	330	-	-	378	491	-	-	-	-	495	691	997	1374	-	-
36	77	113	192	378	444	-	399	-	-	-	-	-	385	556	854	1347	-	-
37	98	137	240	388	-	-	400	-	-	-	-	-	480	696	1044	1296	-	-
38	224	332	472	-	-	-	-	-	-	-	-	-	958	1373	-	-	-	-
39	260	349	460	-	-	-	-	-	-	-	-	-	1111	1367	-	-	-	-
40	220	322	454	-	-	-	-	-	-	-	-	-	935	1225	-	-	-	-
41	178	248	390	-	-	-	-	-	-	-	-	-	918	1219	-	-	-	-
42	264	346	400	-	-	-	-	-	-	-	-	-	973	1200	-	-	-	-
43	241	369	433	-	-	-	-	-	-	-	-	-	1087	1321	-	-	-	-
44	251	362	435	-	-	-	-	-	-	-	-	-	924	1296	1415	-	-	-
45	220	363	495	-	-	-	-	-	-	-	-	-	907	1417	-	-	-	-
46	229	339	457	-	-	-	-	-	-	-	-	-	1065	1376	-	-	-	-
47	202	320	435	-	-	-	-	-	-	-	-	-	904	1204	1491	-	-	-

Table 140. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

TOP_10			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	49.20	9.68	28.02
29	49.67	9.69	27.63
30	49.36	9.60	27.50
31	49.40	10.04	27.42
32	50.46	9.88	27.60
33	50.02	10.19	27.61
34	49.84	9.65	27.87
35	49.55	10.10	27.47
36	51.03	10.13	27.58
37	52.57	9.96	27.92
38	100.80	19.24	55.83
39	100.45	20.06	55.51
40	102.65	19.70	55.04
41	99.46	19.39	54.93
42	100.45	19.42	54.83
43	101.06	19.34	55.05
44	100.07	19.40	54.91
45	100.89	19.39	54.91
46	104.12	20.35	55.41
47	106.60	20.23	55.58

Table 141. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_20									
	fitness value								
	population 500			**population 100**					
case #	**500 generations**			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	95.65%	*93.75%*	*97.41%*	79.58%	*74.90%*	*84.55%*	92.71%	*90.53%*	*94.31%*
29	93.01%	*91.03%*	*94.71%*	73.77%	*71.76%*	*76.52%*	92.55%	*91.19%*	*94.55%*
30	90.87%	*88.73%*	*92.57%*	75.40%	*71.36%*	*77.72%*	89.77%	*87.98%*	*92.52%*
31	91.11%	*89.54%*	*92.43%*	73.25%	*70.49%*	*77.09%*	88.05%	*85.28%*	*90.13%*
32	91.56%	*89.32%*	*92.83%*	76.99%	*74.96%*	*79.31%*	89.76%	*87.37%*	*93.06%*
33	93.35%	*92.28%*	*94.34%*	77.07%	*72.80%*	*80.52%*	91.35%	*88.22%*	*93.96%*
34	91.66%	*90.88%*	*92.27%*	74.90%	*72.23%*	*79.15%*	91.23%	*89.90%*	*93.95%*
35	90.81%	*89.23%*	*92.17%*	77.98%	*74.49%*	*80.51%*	91.38%	*89.96%*	*95.58%*
36	93.55%	*91.29%*	*94.49%*	76.33%	*74.22%*	*77.34%*	91.26%	*90.00%*	*92.97%*
37	93.22%	*92.12%*	*95.10%*	72.80%	*70.26%*	*74.78%*	89.95%	*87.96%*	*92.48%*
38	83.31%	*82.60%*	*85.91%*	60.65%	*56.12%*	*64.16%*	80.50%	*78.72%*	*82.36%*
39	80.84%	*77.30%*	*82.82%*	60.18%	*57.79%*	*62.28%*	80.81%	*79.33%*	*82.09%*
40	83.77%	*81.44%*	*85.96%*	64.11%	*60.80%*	*67.51%*	82.25%	*79.16%*	*84.59%*
41	84.71%	*82.81%*	*86.28%*	63.15%	*58.64%*	*66.94%*	81.72%	*80.21%*	*83.09%*
42	84.08%	*83.59%*	*84.88%*	62.75%	*58.13%*	*65.62%*	83.52%	*81.42%*	*85.56%*
43	82.80%	*80.63%*	*85.68%*	63.82%	*60.65%*	*66.85%*	81.56%	*79.65%*	*82.77%*
44	83.60%	*80.60%*	*85.90%*	63.82%	*61.18%*	*68.24%*	82.34%	*79.71%*	*84.01%*
45	83.07%	*81.18%*	*85.68%*	63.79%	*61.22%*	*66.56%*	81.26%	*79.27%*	*84.19%*
46	83.93%	*81.52%*	*87.03%*	58.49%	*55.28%*	*62.30%*	80.94%	*79.37%*	*82.25%*
47	85.15%	*83.74%*	*86.24%*	65.54%	*61.22%*	*68.05%*	84.00%	*82.50%*	*86.85%*

Table 142. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_20																		
	population 500						**population 100**											
case #	**500 generations**						**500 generations**						**1500 generations**					
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%
28	120	138	171	234	382	-	293	324	-	-	-	-	303	434	680	1140	-	-
29	144	173	226	386	-	-	433	-	-	-	-	-	405	524	739	1099	-	-
30	149	185	248	404	-	-	457	-	-	-	-	-	447	633	895	1193	-	-
31	160	182	258	383	-	-	443	-	-	-	-	-	504	730	1067	1483	-	-
32	145	176	256	379	-	-	397	-	-	-	-	-	368	579	967	1230	-	-
33	133	153	190	292	-	-	392	448	-	-	-	-	449	666	893	1055	-	-
34	135	187	250	430	-	-	466	-	-	-	-	-	439	548	907	1286	-	-
35	159	213	284	445	-	-	404	482	-	-	-	-	468	606	860	1257	1455	-
36	143	164	216	363	-	-	391	-	-	-	-	-	382	510	782	1274	-	-
37	148	174	245	391	495	-	-	-	-	-	-	-	450	638	975	1347	-	-
38	252	360	458	-	-	-	-	-	-	-	-	-	1021	1357	-	-	-	-
39	295	413	-	-	-	-	-	-	-	-	-	-	994	1324	-	-	-	-
40	258	357	451	-	-	-	-	-	-	-	-	-	888	1200	-	-	-	-
41	266	351	474	-	-	-	-	-	-	-	-	-	922	1287	-	-	-	-
42	250	350	-	-	-	-	-	-	-	-	-	-	876	1164	1462	-	-	-
43	258	409	476	-	-	-	-	-	-	-	-	-	963	1394	-	-	-	-
44	270	367	474	-	-	-	-	-	-	-	-	-	1057	1297	-	-	-	-
45	259	387	457	-	-	-	-	-	-	-	-	-	876	1261	-	-	-	-
46	270	359	412	-	-	-	-	-	-	-	-	-	897	1255	-	-	-	-
47	233	311	449	-	-	-	-	-	-	-	-	-	910	1190	1311	-	-	-

Table 143. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

TOP_20			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	51.82	10.02	27.28
29	52.33	10.10	27.26
30	52.01	9.97	27.20
31	50.84	9.90	27.15
32	49.46	9.88	27.24
33	51.52	9.75	27.09
34	52.16	9.80	27.33
35	50.04	9.50	27.32
36	49.00	9.41	27.26
37	49.44	9.47	27.18
38	98.04	18.95	54.48
39	98.59	19.21	54.46
40	96.69	19.00	54.49
41	96.74	18.89	54.38
42	98.67	19.06	54.34
43	98.70	19.00	55.24
44	99.06	19.51	55.51
45	101.44	19.65	55.95
46	104.01	19.97	54.88
47	101.18	19.90	54.60

Table 144. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_30									
case #	**fitness value**								
	population 500			**population 100**					
	500 generations			**500 generations**			**1500 generations**		
	avg	*min*	*max*	avg	*min*	*max*	avg	*min*	*max*
28	80.94%	*74.26%*	*87.23%*	77.05%	*71.79%*	*84.34%*	94.16%	*92.12%*	*95.89%*
29	86.61%	*82.33%*	*88.13%*	71.51%	*69.27%*	*76.23%*	92.44%	*90.00%*	*94.74%*
30	81.59%	*79.42%*	*84.74%*	71.53%	*68.11%*	*74.22%*	89.43%	*86.22%*	*91.06%*
31	79.46%	*75.02%*	*85.50%*	69.16%	*64.07%*	*73.78%*	90.06%	*89.36%*	*90.50%*
32	82.12%	*75.89%*	*86.52%*	71.04%	*69.78%*	*72.16%*	91.19%	*89.21%*	*93.19%*
33	79.43%	*73.72%*	*89.48%*	74.18%	*71.61%*	*77.39%*	91.13%	*89.31%*	*93.14%*
34	81.23%	*67.91%*	*86.05%*	72.38%	*69.14%*	*77.16%*	91.08%	*89.98%*	*92.42%*
35	85.45%	*81.85%*	*87.76%*	70.93%	*68.80%*	*74.14%*	90.76%	*89.17%*	*91.87%*
36	76.04%	*73.05%*	*82.06%*	71.67%	*69.50%*	*73.21%*	92.19%	*89.42%*	*93.83%*
37	82.53%	*77.66%*	*86.60%*	68.89%	*63.88%*	*74.90%*	90.27%	*86.23%*	*93.86%*
38	58.20%	*52.12%*	*64.21%*	59.04%	*56.47%*	*61.29%*	82.48%	*80.01%*	*85.10%*
39	49.20%	*43.36%*	*57.49%*	58.86%	*55.65%*	*62.03%*	80.25%	*76.15%*	*83.21%*
40	58.09%	*50.10%*	*72.58%*	58.05%	*54.94%*	*61.93%*	82.77%	*78.72%*	*84.63%*
41	53.88%	*48.85%*	*61.41%*	60.09%	*58.63%*	*61.81%*	82.90%	*80.90%*	*84.30%*
42	60.79%	*58.26%*	*64.41%*	55.63%	*53.19%*	*58.56%*	82.38%	*81.01%*	*83.55%*
43	58.51%	*54.36%*	*67.61%*	60.37%	*56.84%*	*64.02%*	83.10%	*79.44%*	*85.49%*
44	57.95%	*48.28%*	*63.94%*	58.17%	*54.79%*	*64.06%*	81.50%	*80.18%*	*83.11%*
45	52.56%	*45.87%*	*63.44%*	59.14%	*53.45%*	*63.06%*	80.71%	*78.83%*	*83.89%*
46	58.43%	*51.67%*	*62.53%*	60.19%	*53.68%*	*65.34%*	82.22%	*80.80%*	*84.38%*
47	62.42%	*53.64%*	*66.16%*	60.09%	*56.14%*	*62.84%*	84.70%	*83.26%*	*86.08%*

Table 145. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28–47 in our experiments.

TOP_30																				
	population 500						**population 100**													
case #	**500 generations**						**500 generations**						**1500 generations**							
	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%	75%	80%	85%	90%	95%	100%		
28	390	412	460	-	-	-	361	337	-	-	-	-	305	420	566	862	1329	-		
29	367	411	446	-	-	-	437	-	-	-	-	-	420	544	781	1169	-	-		
30	417	450	-	-	-	-	-	-	-	-	-	-	493	664	1018	1372	-	-		
31	454	462	478	-	-	-	-	-	-	-	-	-	483	669	987	1407	-	-		
32	403	433	462	-	-	-	-	-	-	-	-	-	380	513	851	1211	-	-		
33	405	406	421	-	-	-	394	-	-	-	-	-	430	594	847	1325	-	-		
34	403	443	496	-	-	-	392	-	-	-	-	-	393	528	866	1206	-	-		
35	384	434	470	-	-	-	-	-	-	-	-	-	437	582	872	1381	-	-		
36	457	458	-	-	-	-	-	-	-	-	-	-	318	448	715	1017	-	-		
37	404	434	481	-	-	-	-	-	-	-	-	-	491	677	958	1074	-	-		
38	-	-	-	-	-	-	-	-	-	-	-	-	948	1259	1495	-	-	-		
39	-	-	-	-	-	-	-	-	-	-	-	-	1018	1340	-	-	-	-		
40	-	-	-	-	-	-	-	-	-	-	-	-	827	1036	-	-	-	-		
41	-	-	-	-	-	-	-	-	-	-	-	-	905	1272	-	-	-	-		
42	-	-	-	-	-	-	-	-	-	-	-	-	973	1246	-	-	-	-		
43	-	-	-	-	-	-	-	-	-	-	-	-	895	1130	1492	-	-	-		
44	-	-	-	-	-	-	-	-	-	-	-	-	942	1311	-	-	-	-		
45	-	-	-	-	-	-	-	-	-	-	-	-	996	1249	-	-	-	-		
46	-	-	-	-	-	-	-	-	-	-	-	-	911	1291	-	-	-	-		
47	-	-	-	-	-	-	-	-	-	-	-	-	757	1059	1444	-	-	-		

Table 146. Average time of the optimizations of synthetic datasets for Cases 28–47 in our experiments. The average time is displayed as seconds.

TOP_30			
	pop. 500	**pop. 100**	
case #	**500 gen.**	**500 gen.**	**1500 gen.**
	avg. time	avg. time	avg. time
28	49.54	9.59	26.87
29	49.34	9.61	27.28
30	48.23	9.64	27.30
31	49.47	9.65	26.68
32	49.62	9.72	26.83
33	48.13	9.69	26.93
34	48.89	9.51	26.86
35	48.22	9.57	27.63
36	46.78	9.53	27.09
37	49.41	9.63	26.80
38	96.84	18.88	53.78
39	98.49	18.65	55.22
40	96.00	18.86	54.33
41	97.31	18.51	55.42
42	93.76	18.45	53.99
43	96.05	18.28	53.80
44	91.78	18.10	54.13
45	95.48	19.06	54.52
46	95.58	18.77	53.84
47	97.32	18.45	53.95

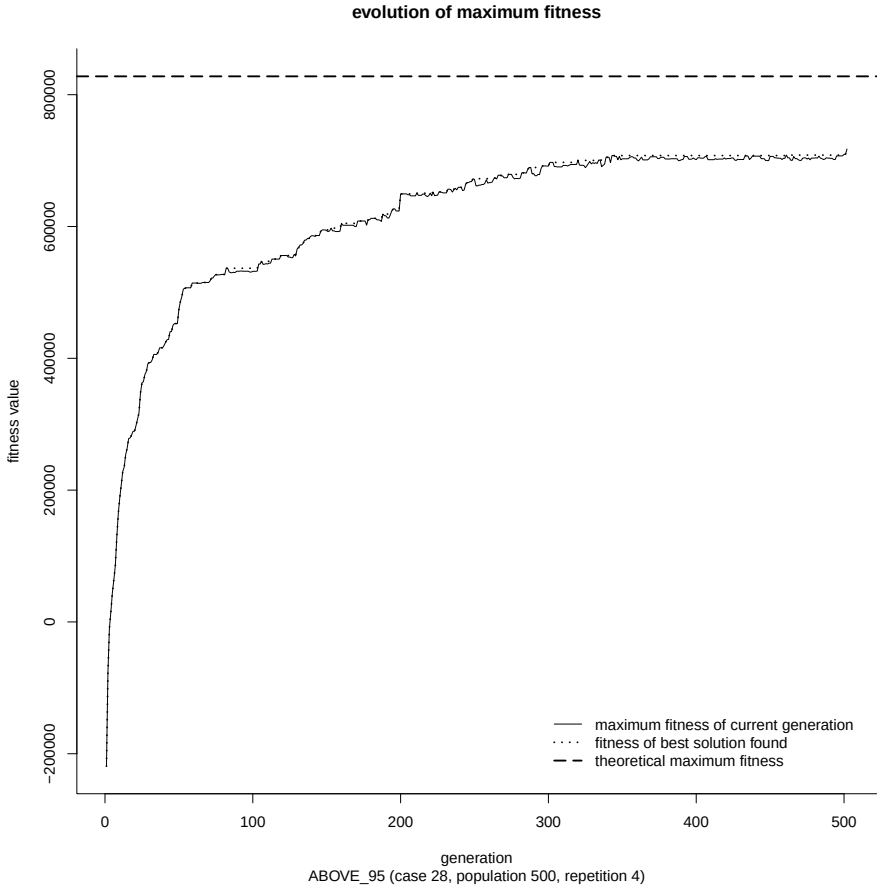

Fig. 62. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

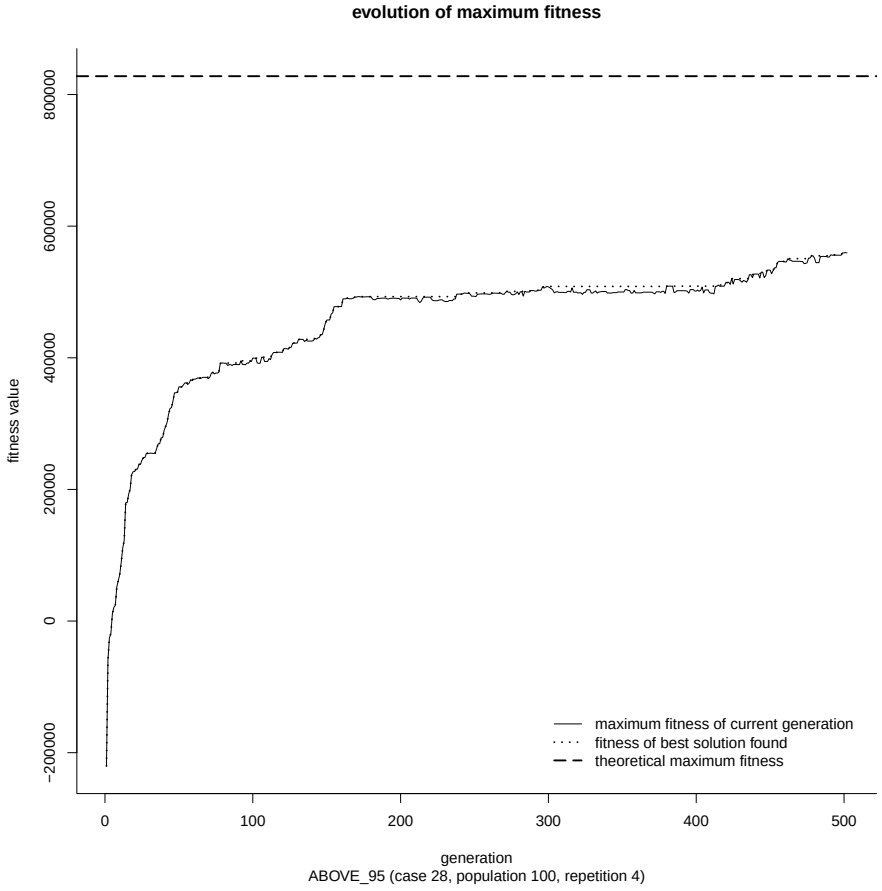

Fig. 63. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

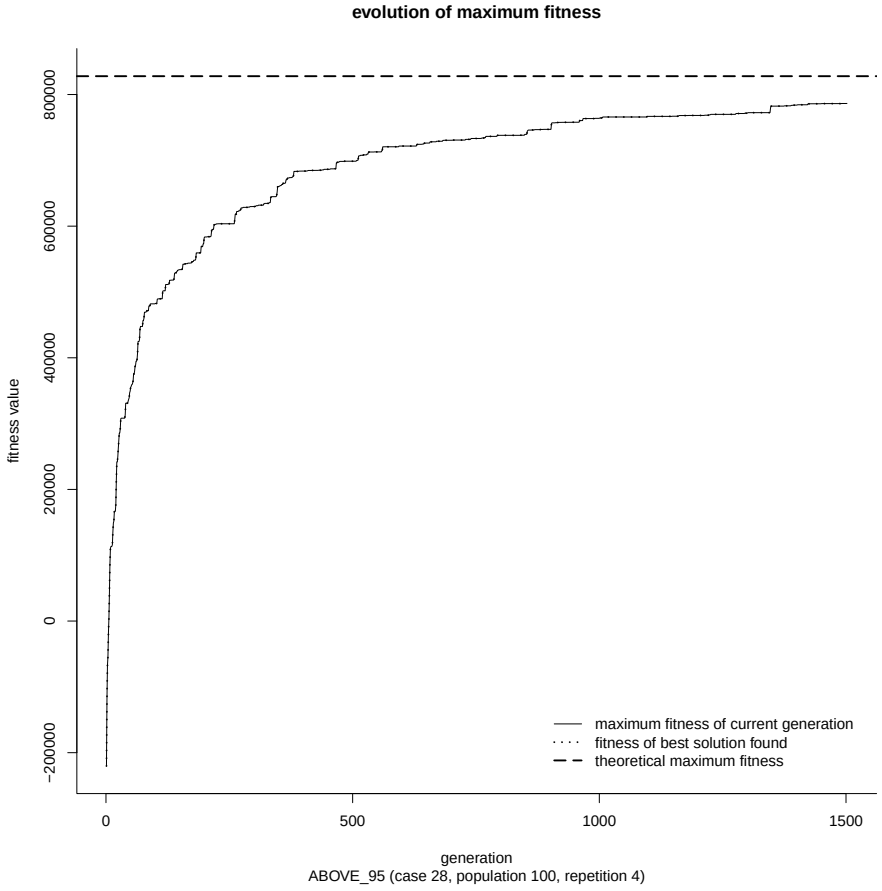

Fig. 64. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

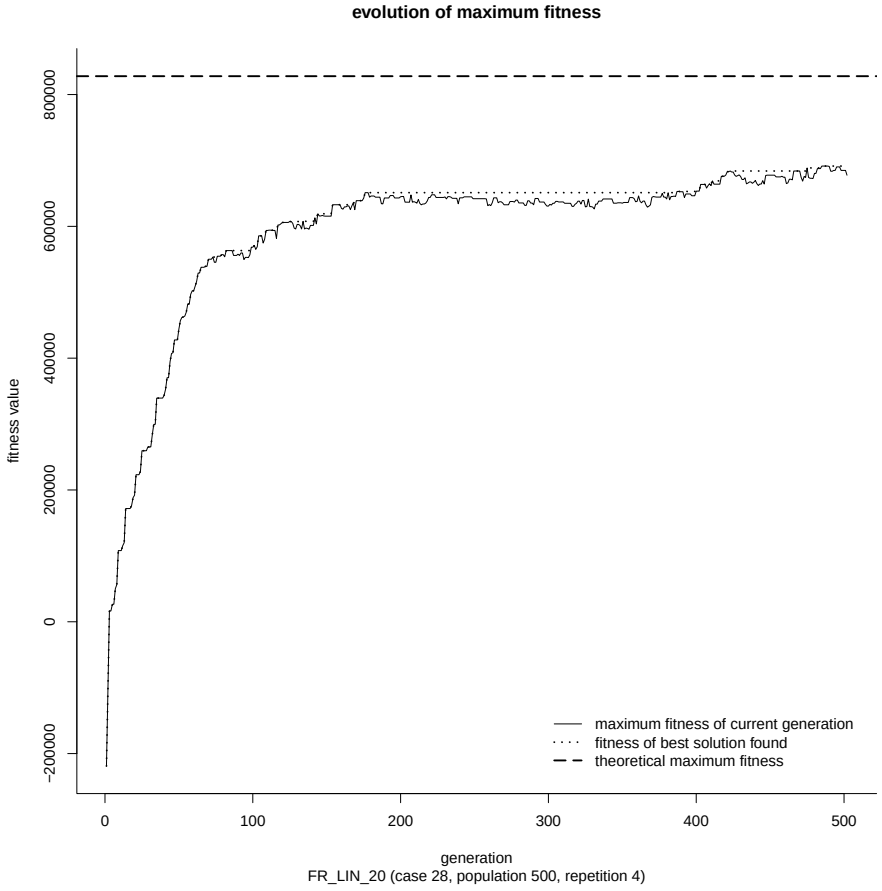

Fig. 65. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

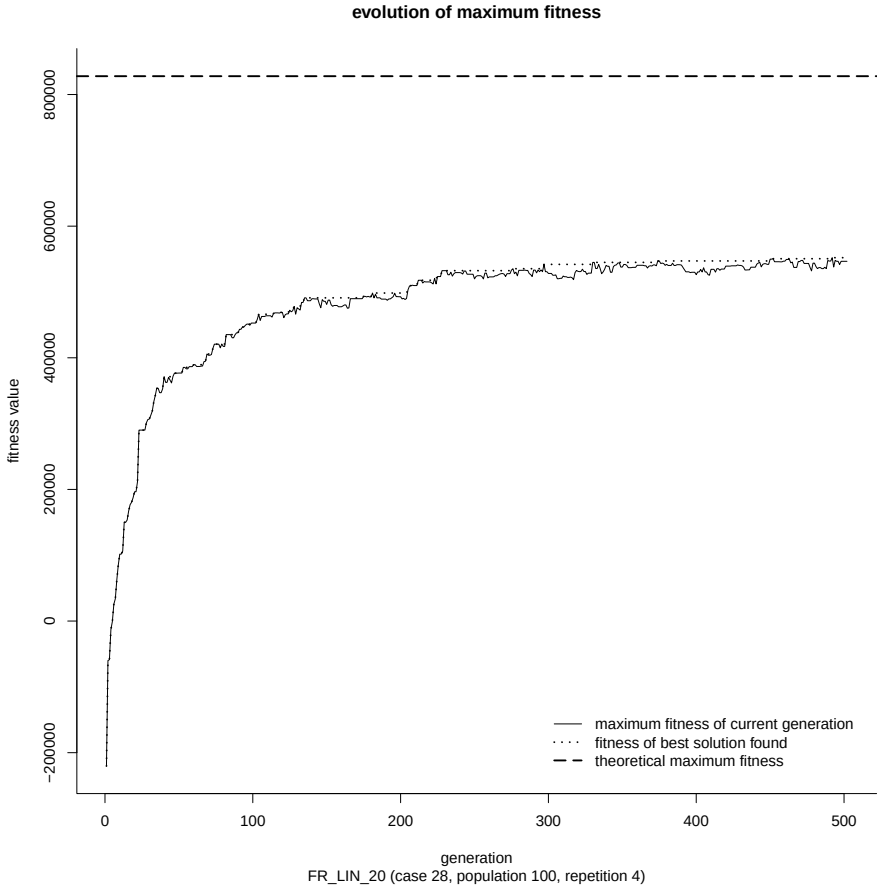

Fig. 66. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

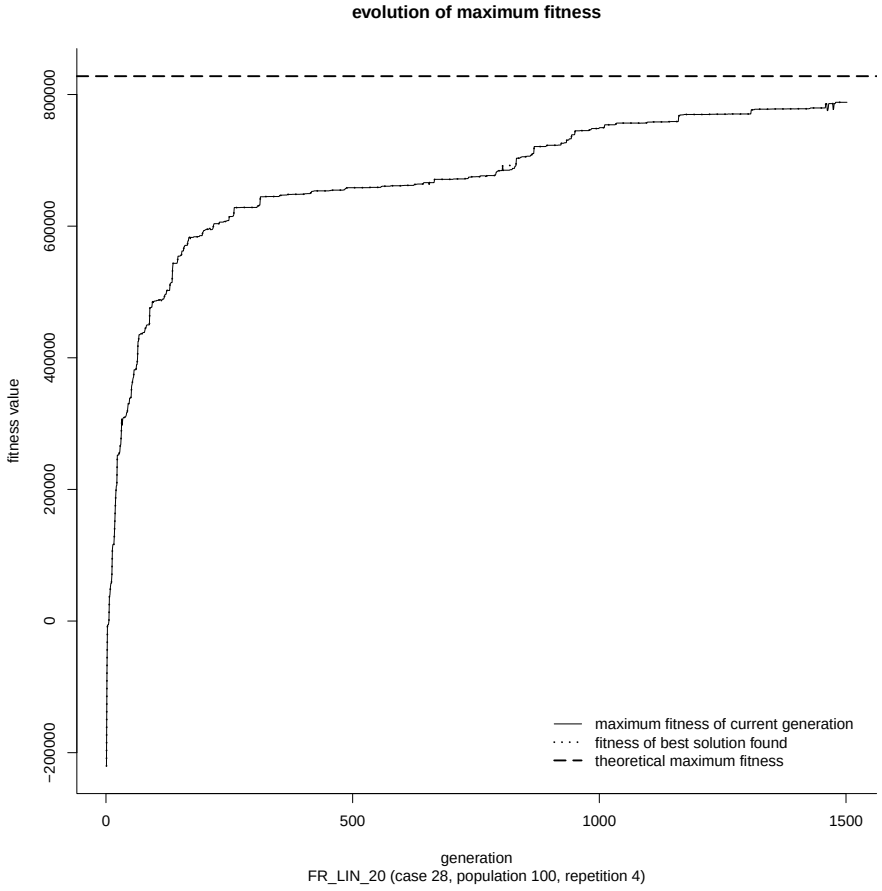

Fig. 67. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

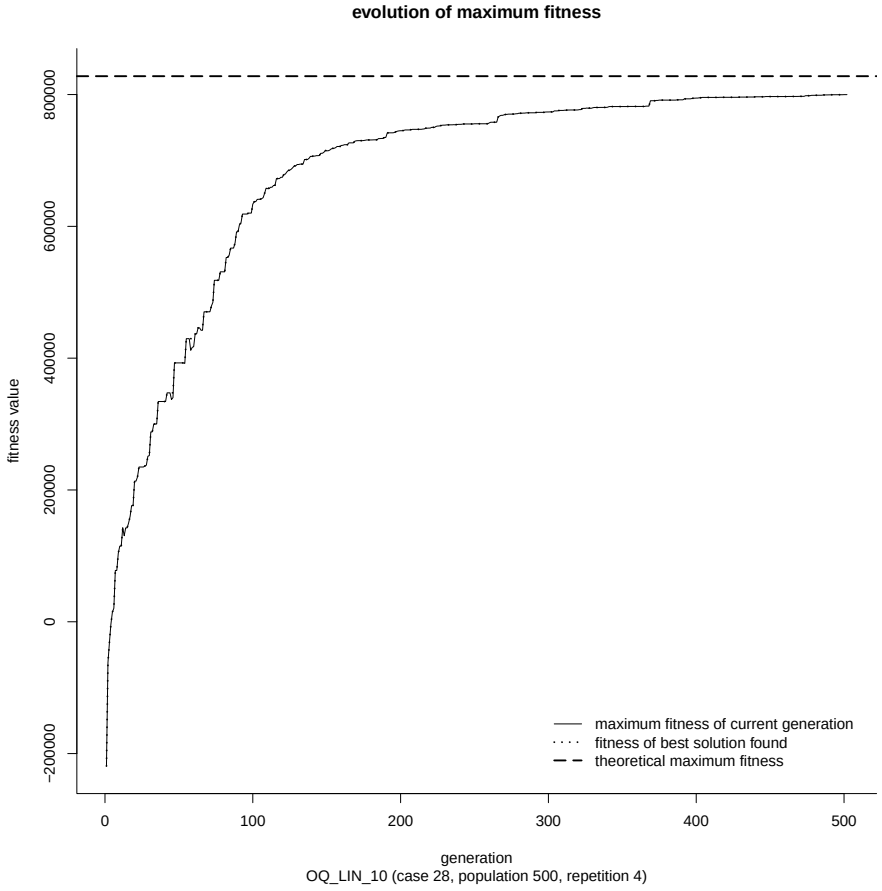

Fig. 68. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

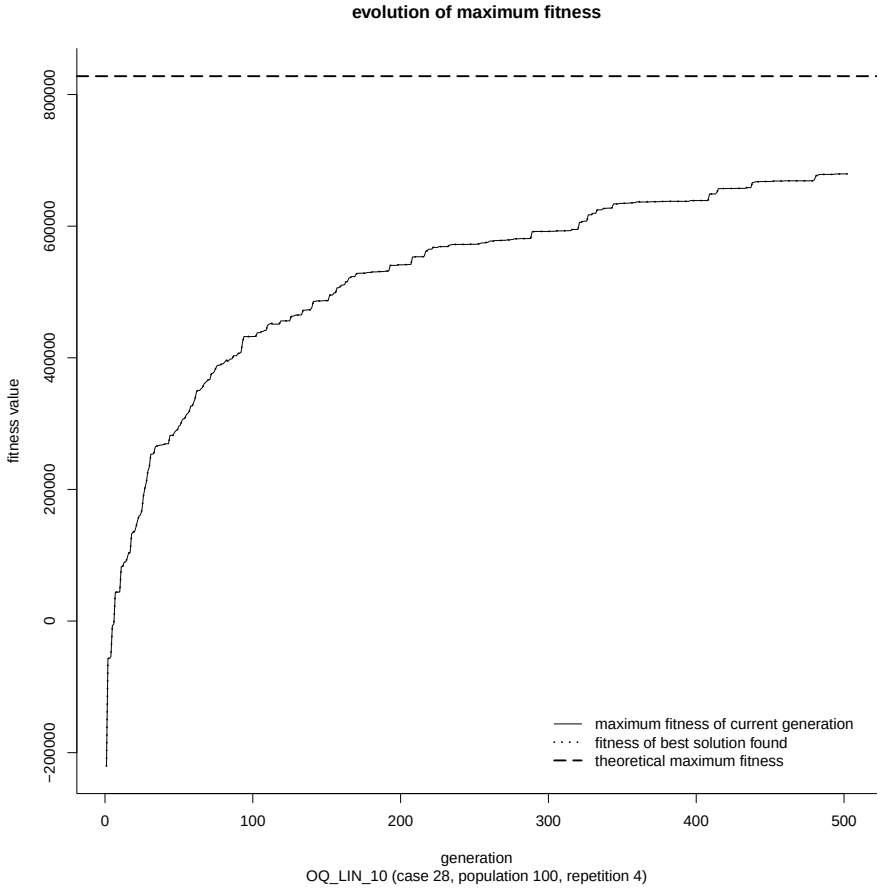

Fig. 69. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

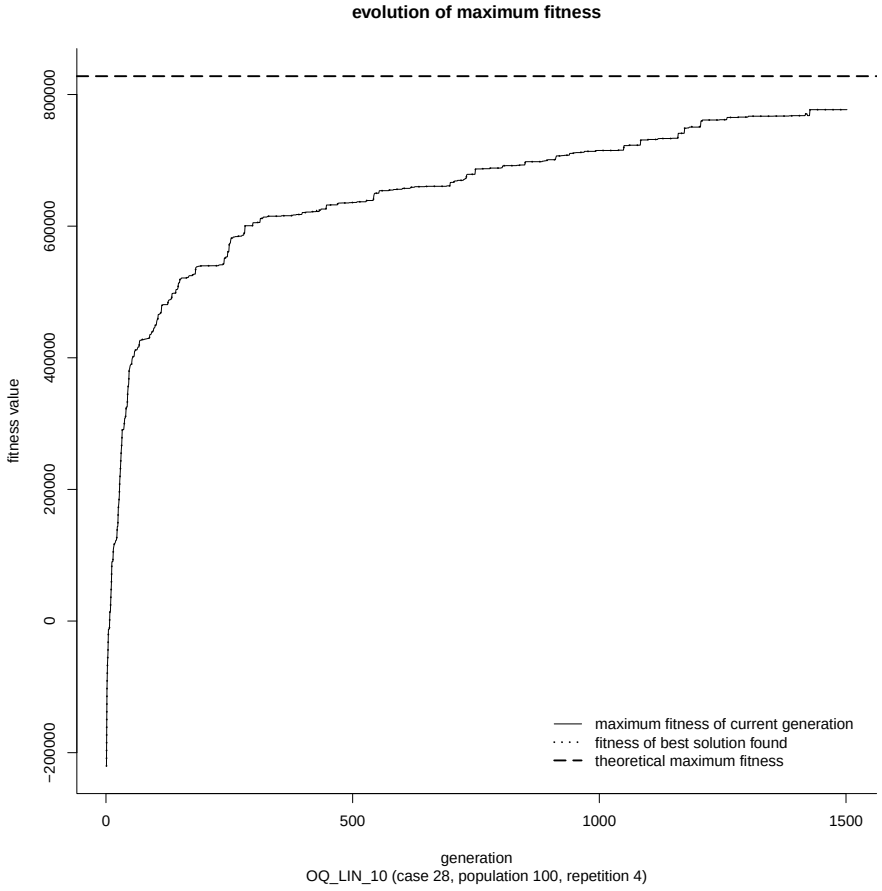

Fig. 70. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

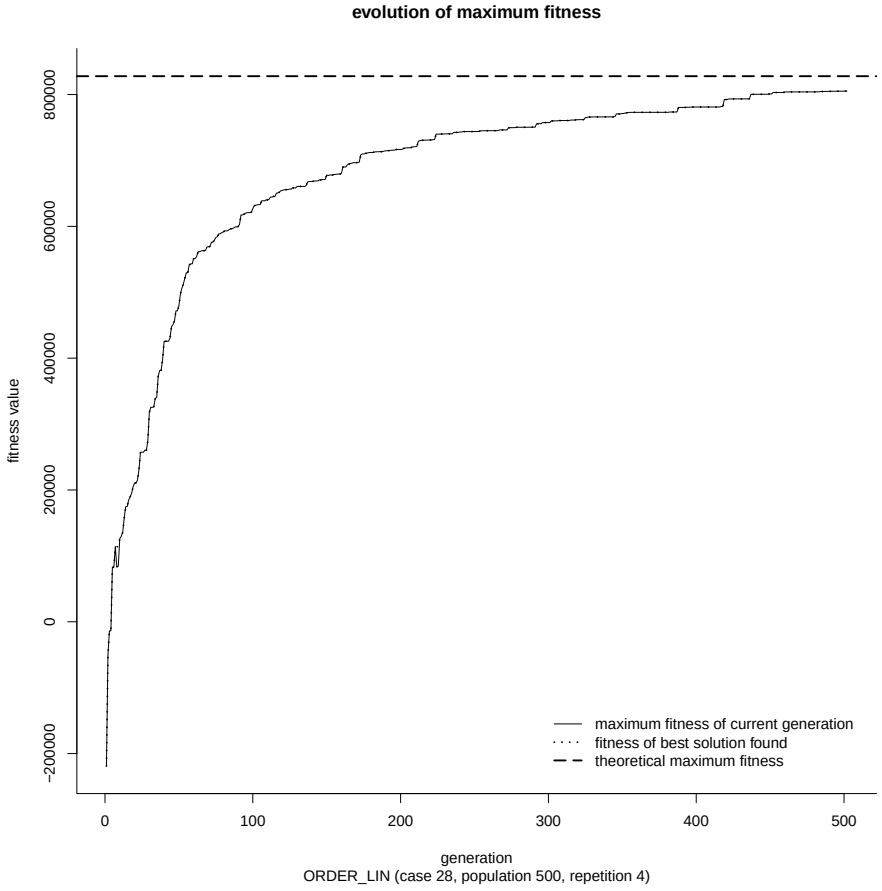

Fig. 71. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

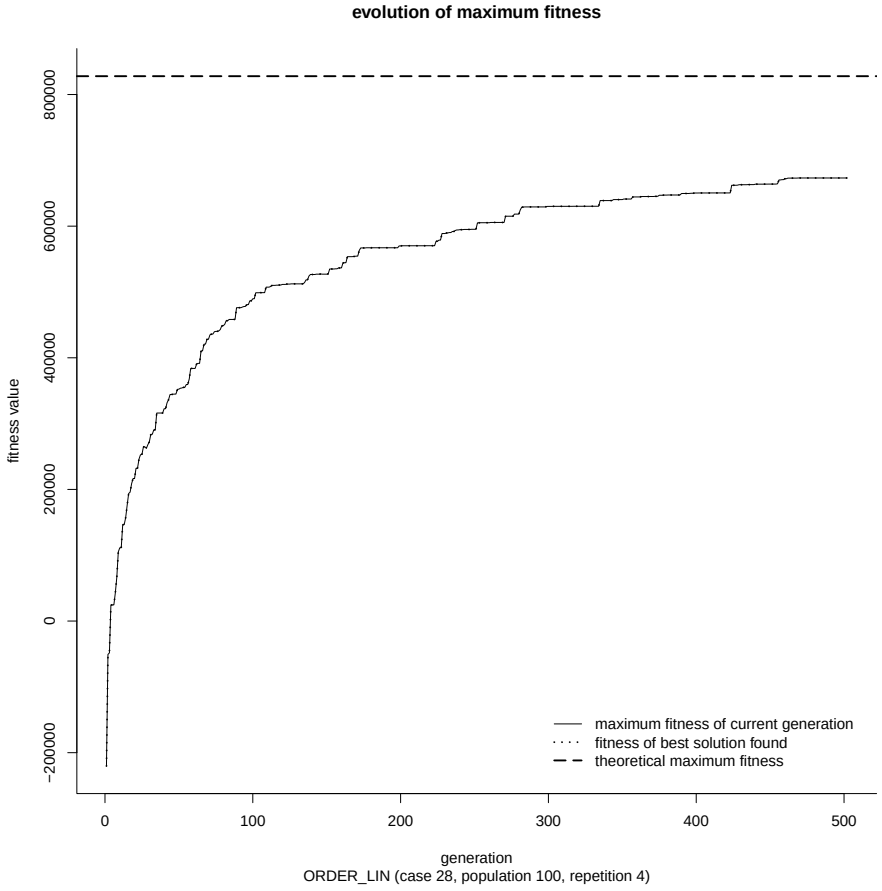

Fig. 72. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

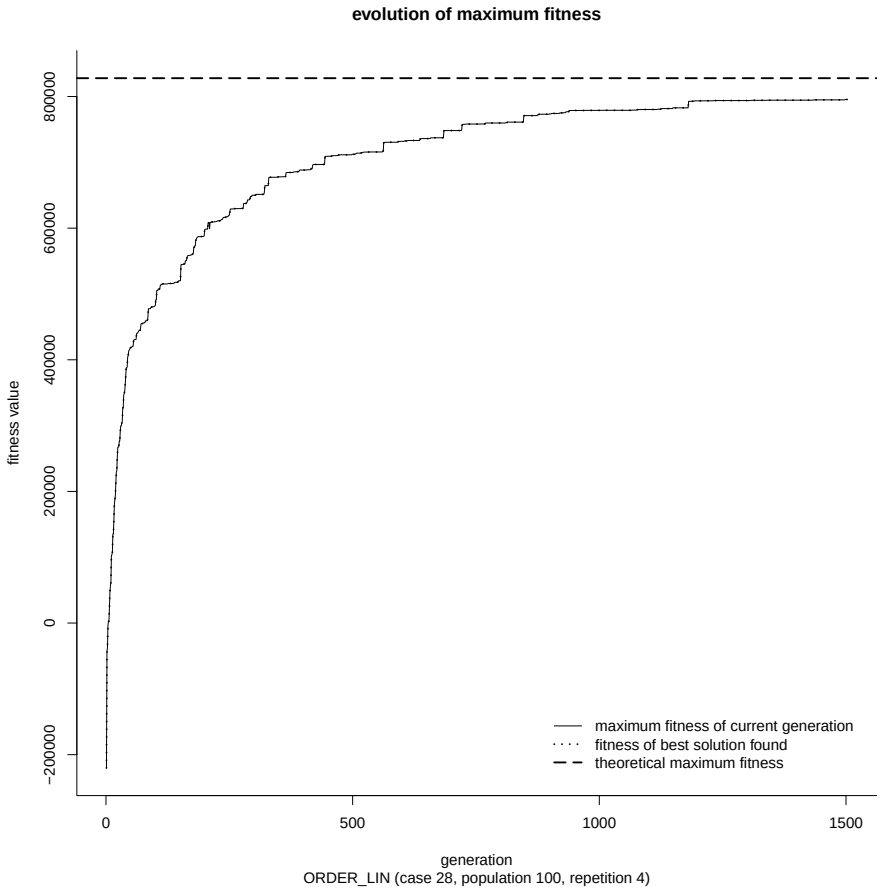

Fig. 73. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

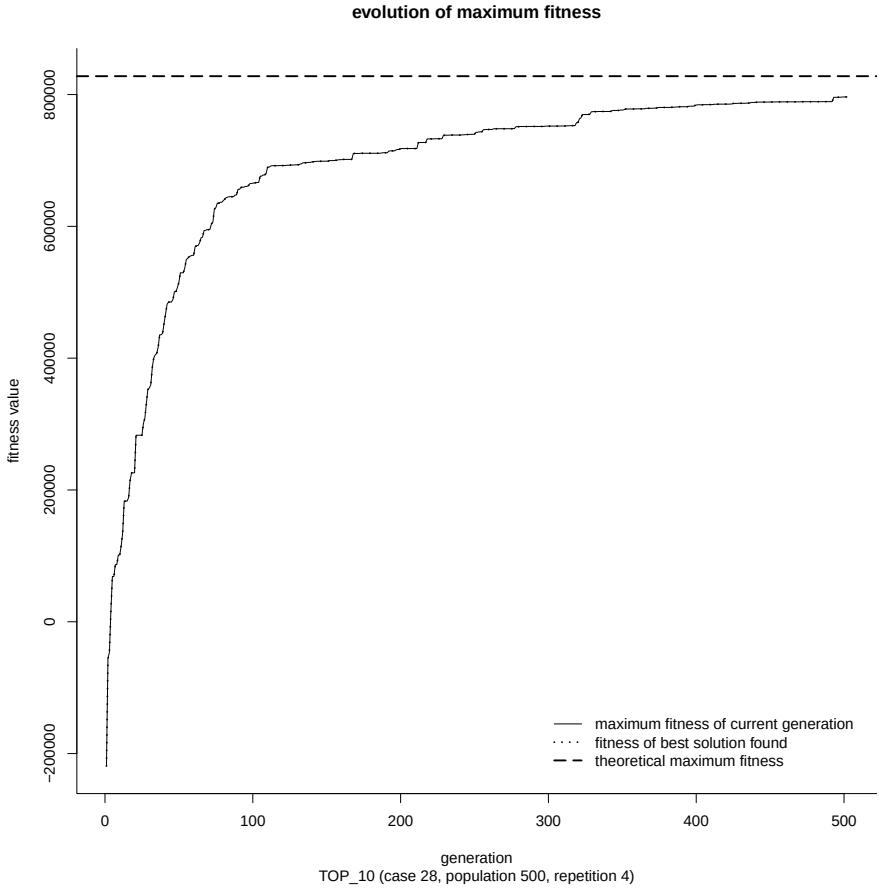

Fig. 74. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

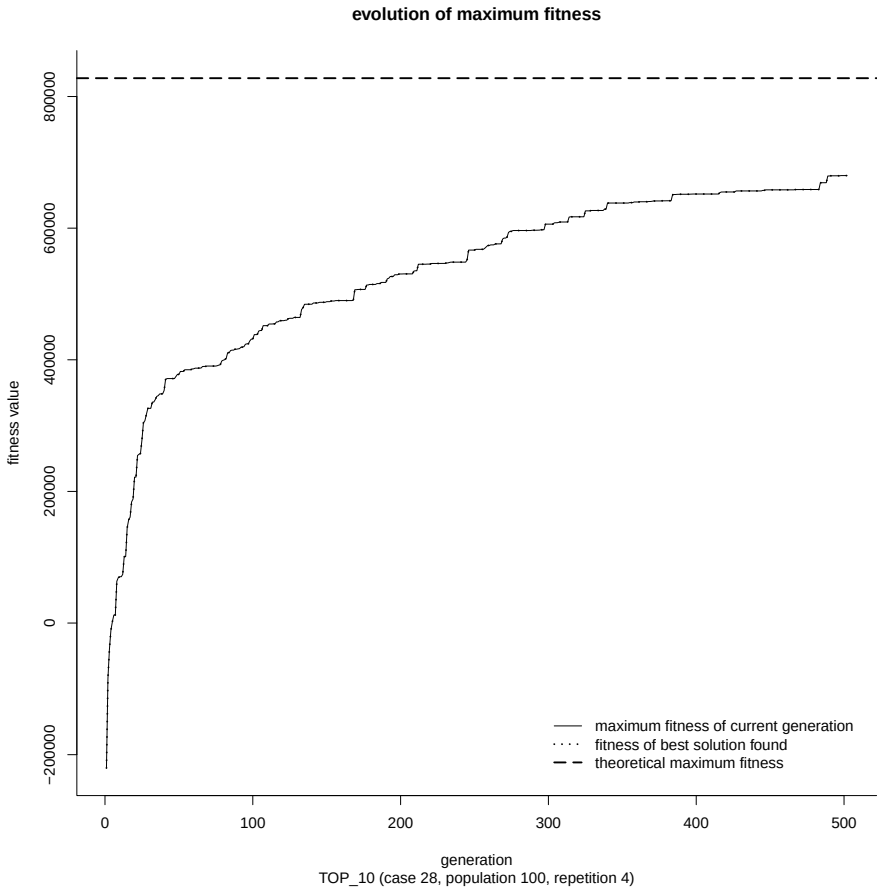

Fig. 75. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

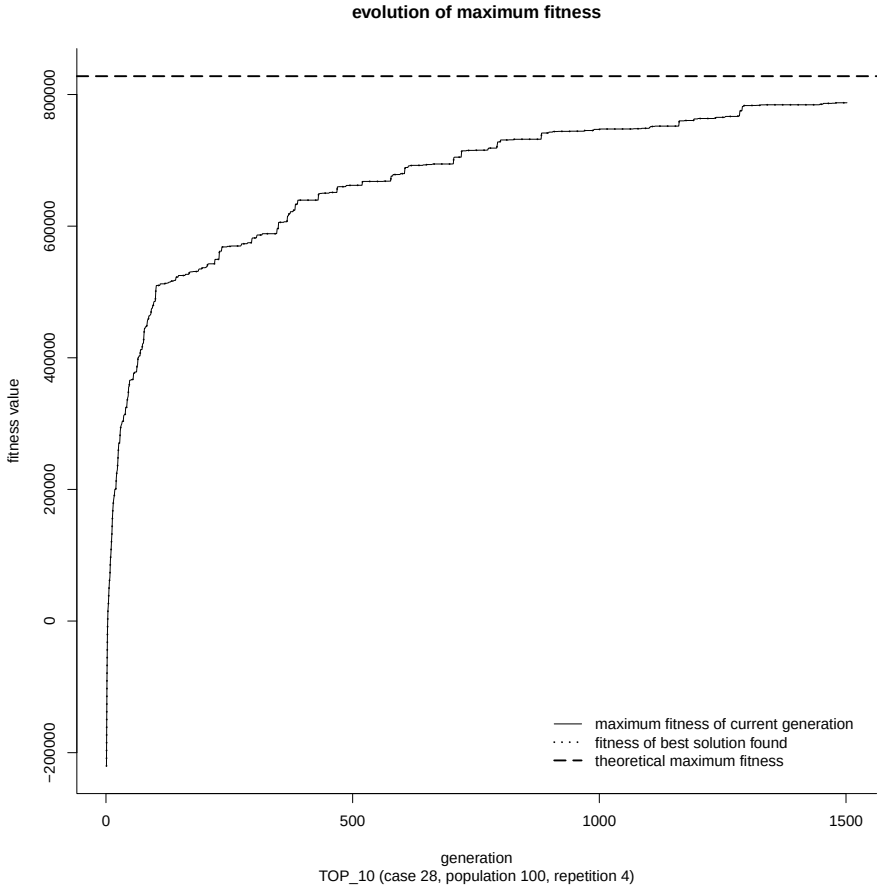

Fig. 76. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

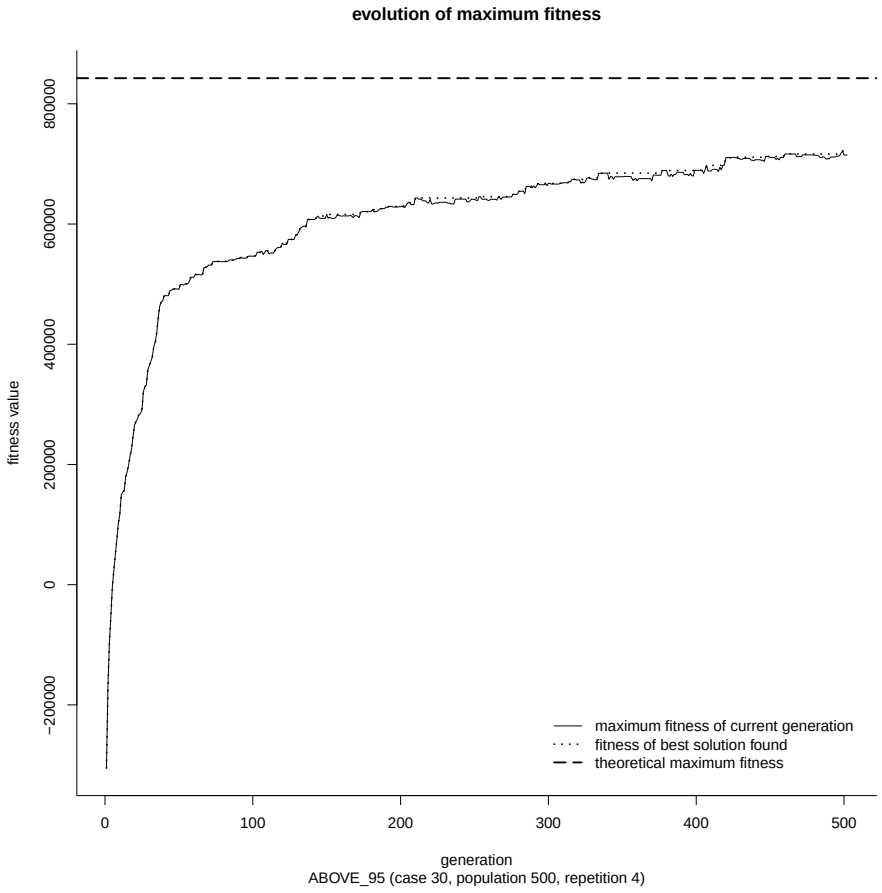

Fig. 77. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

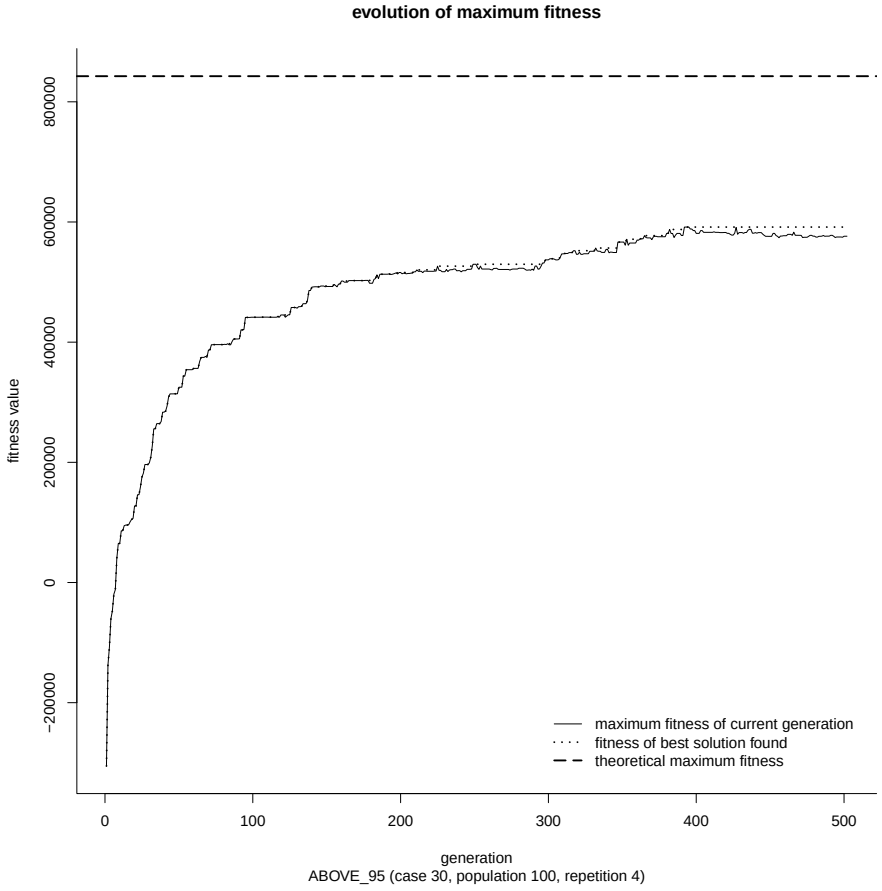

Fig. 78. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

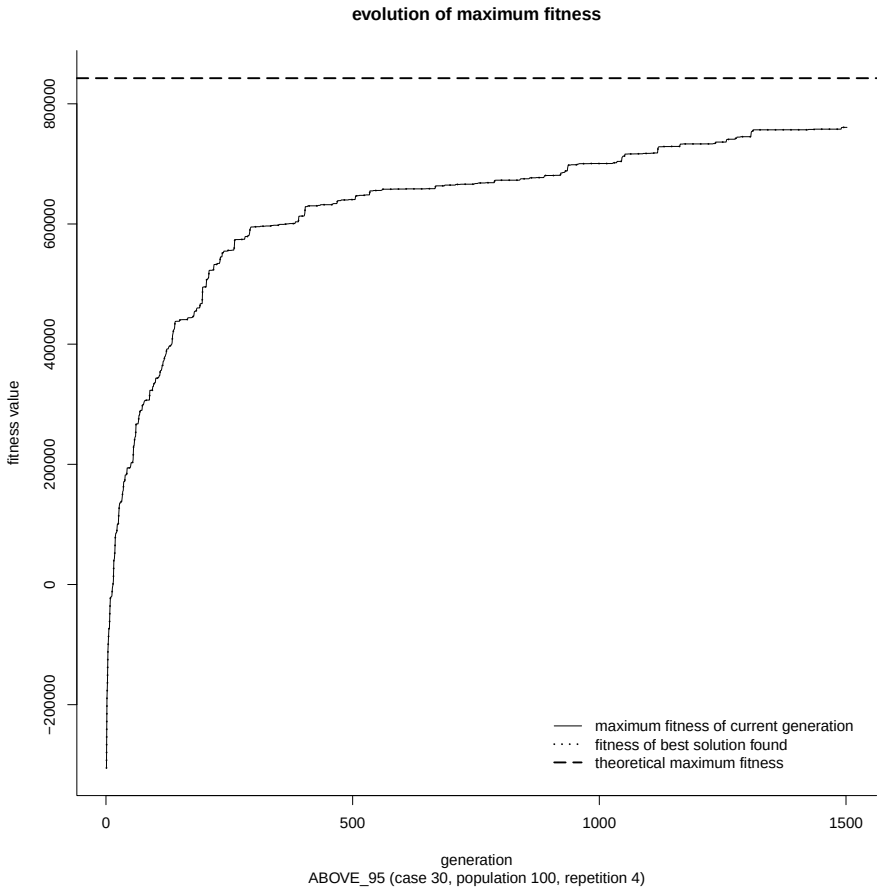

Fig. 79. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

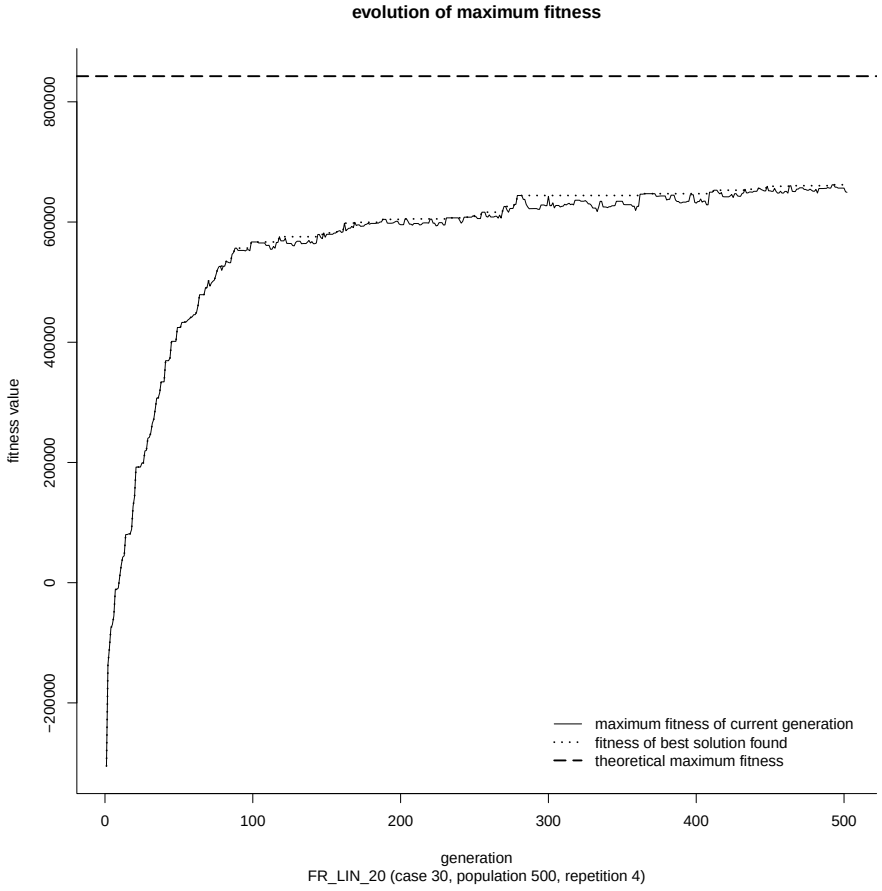

Fig. 80. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

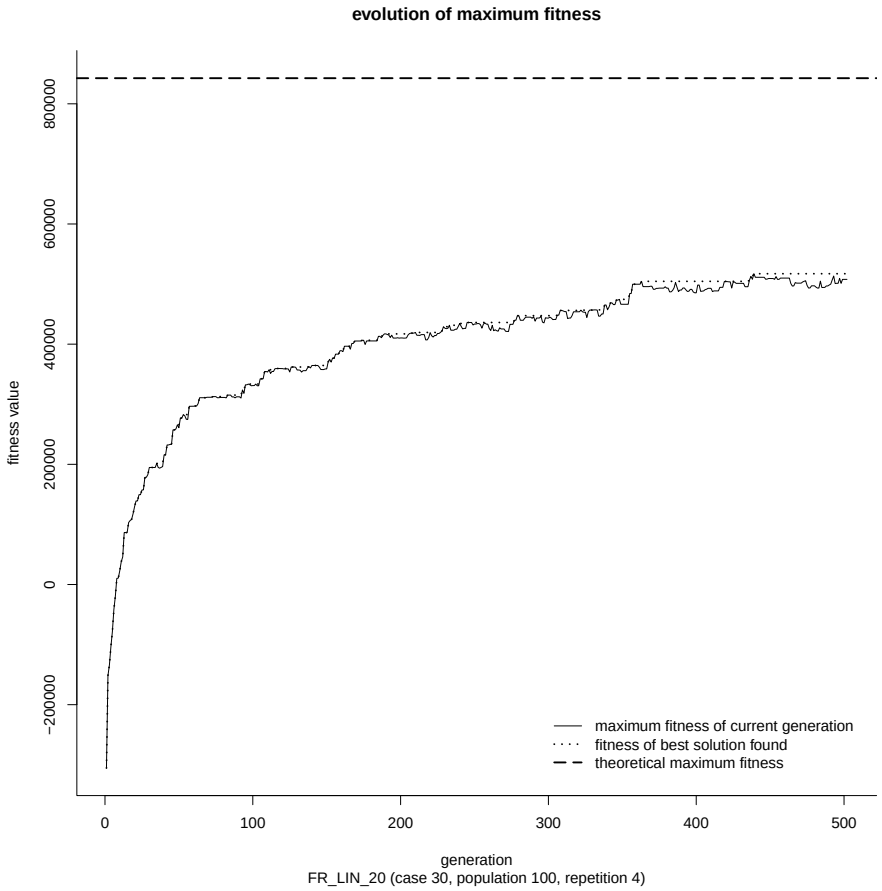

Fig. 81. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

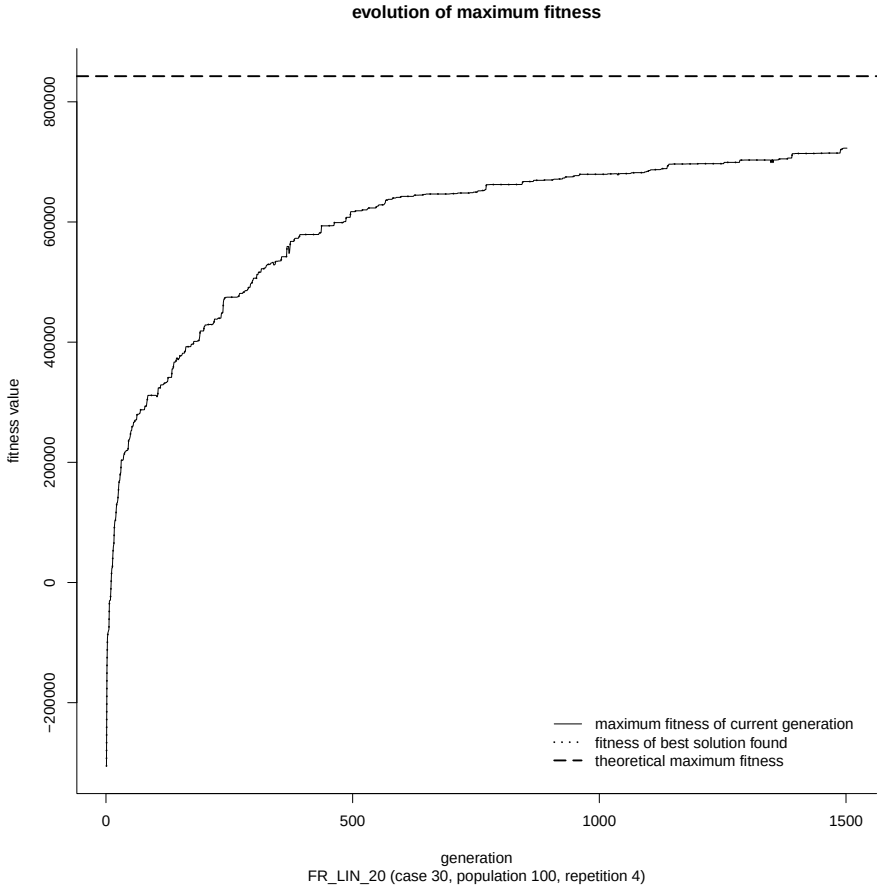

Fig. 82. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

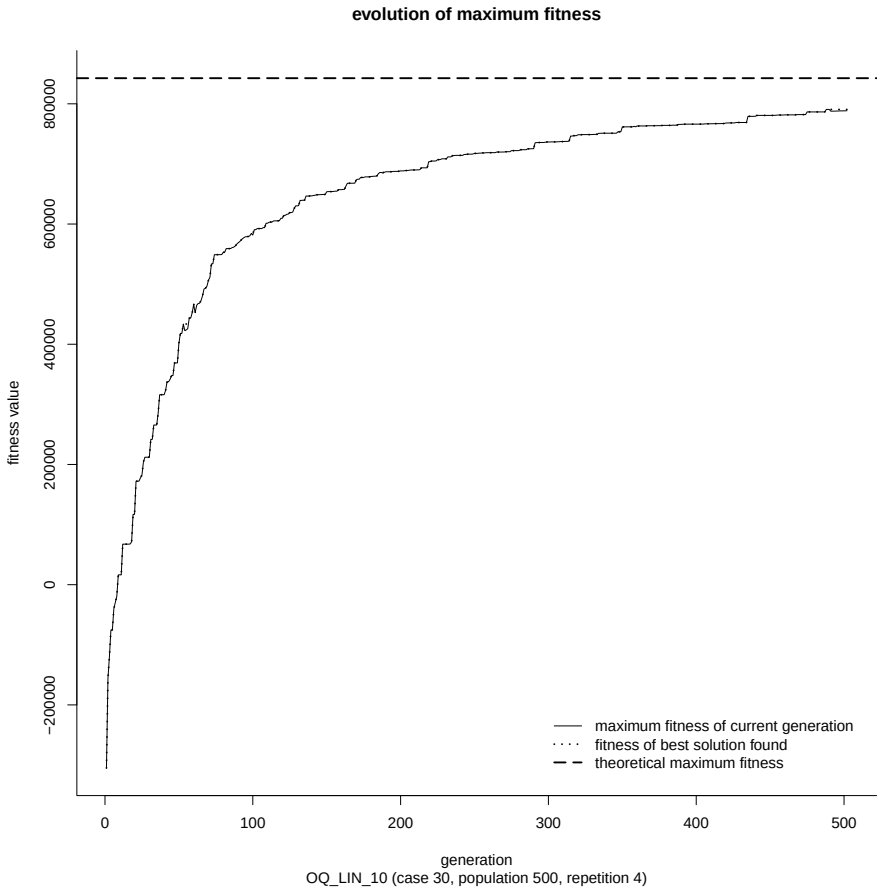

Fig. 83. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

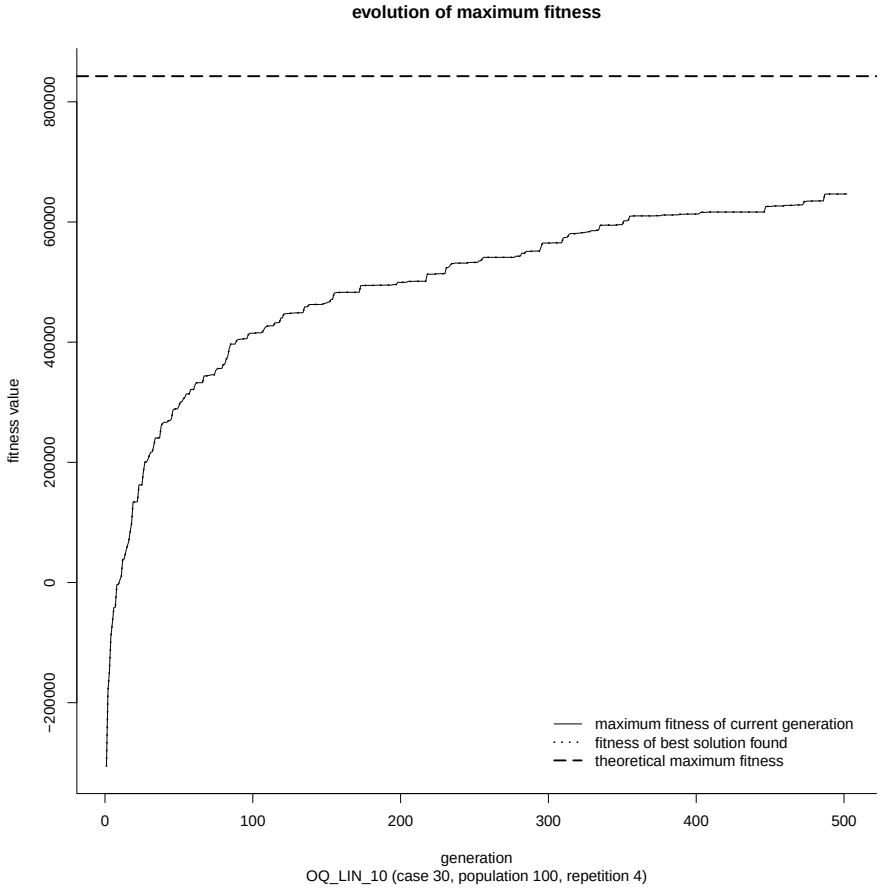

Fig. 84. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

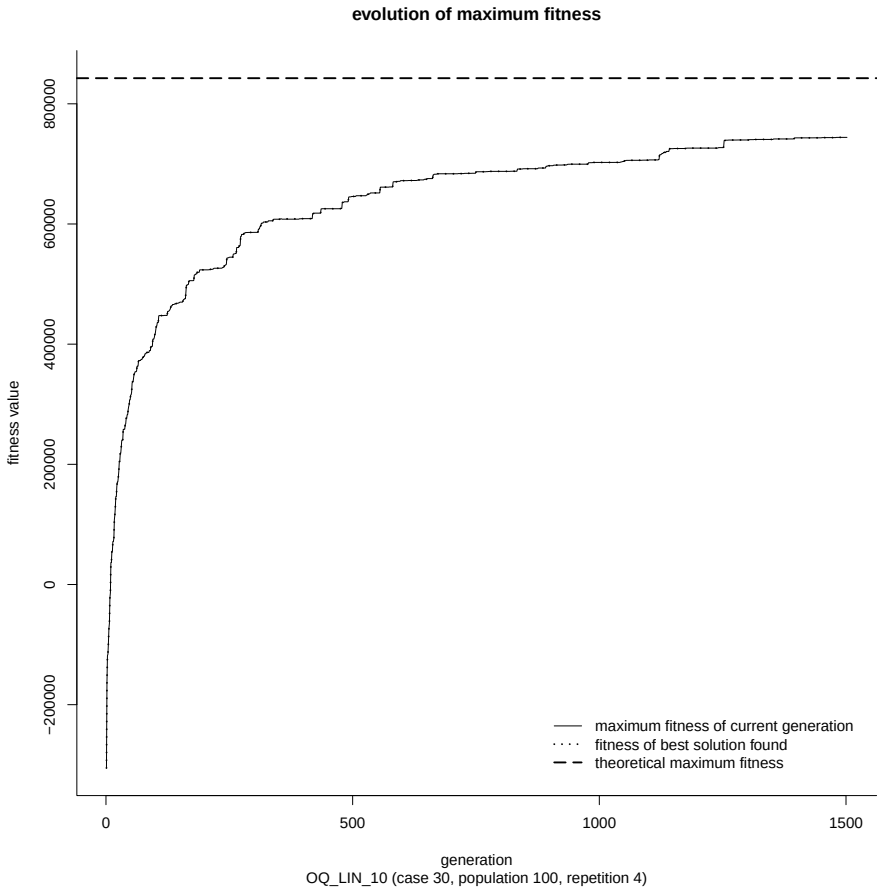

Fig. 85. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

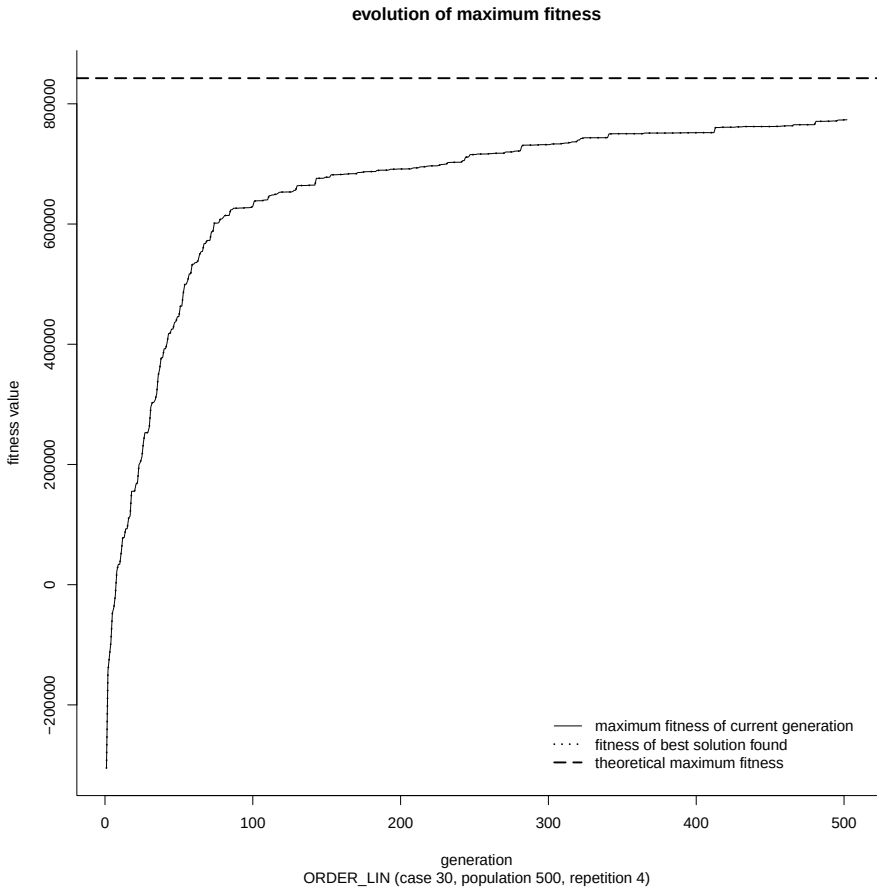

Fig. 86. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

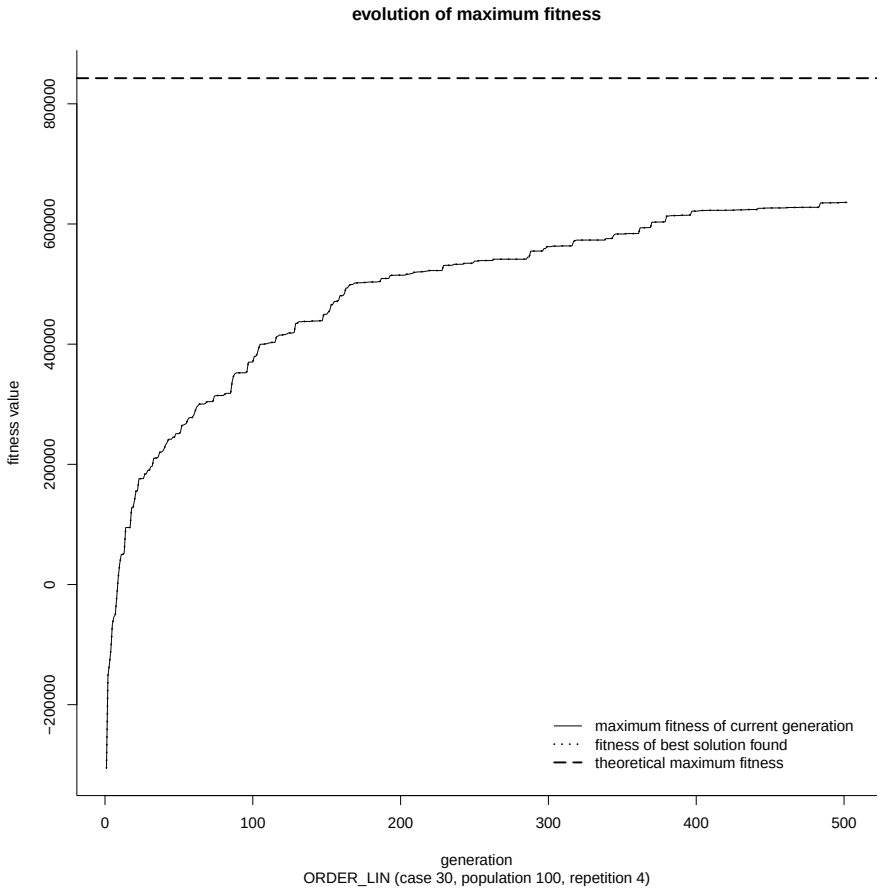

Fig. 87. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

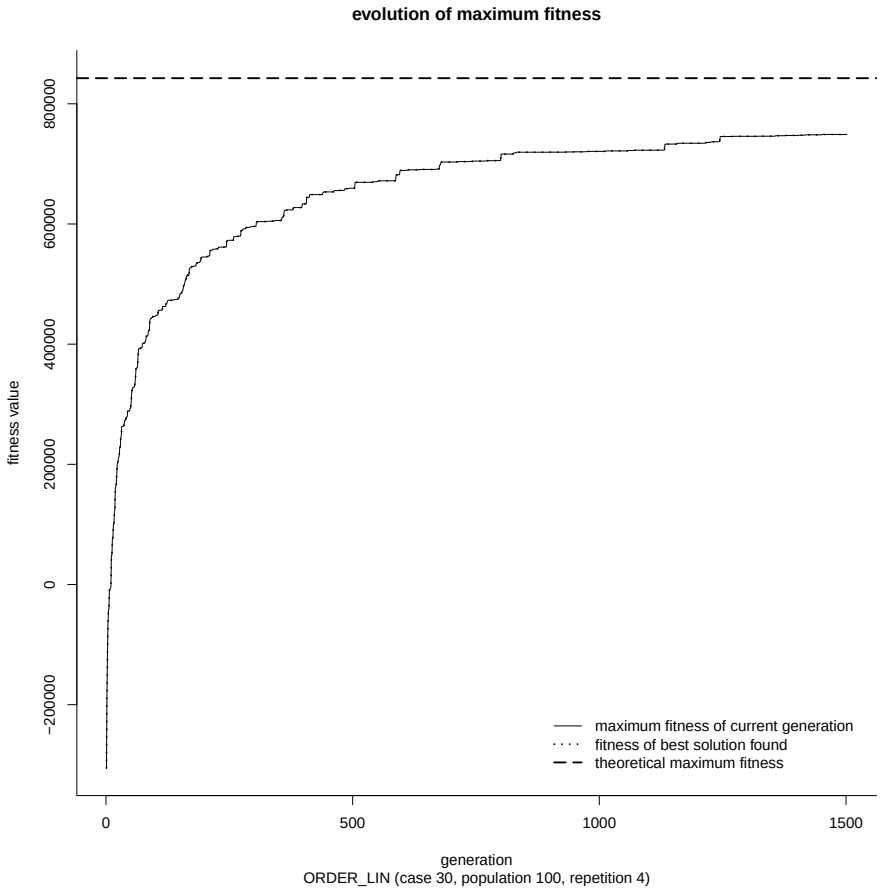

Fig. 88. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

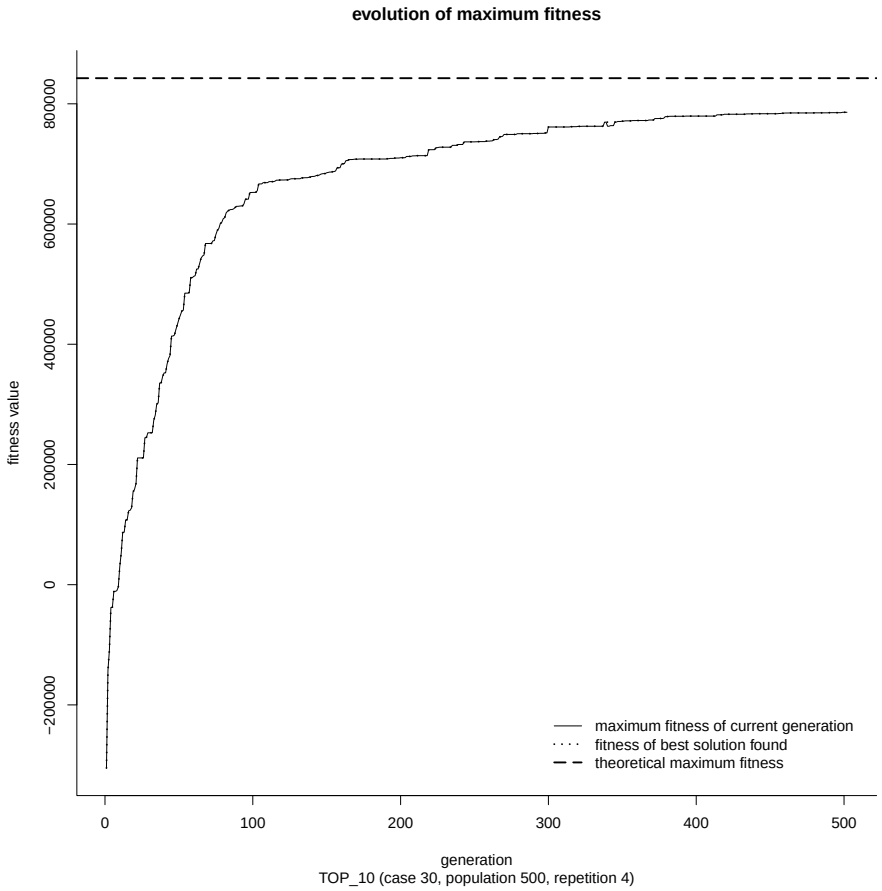

Fig. 89. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

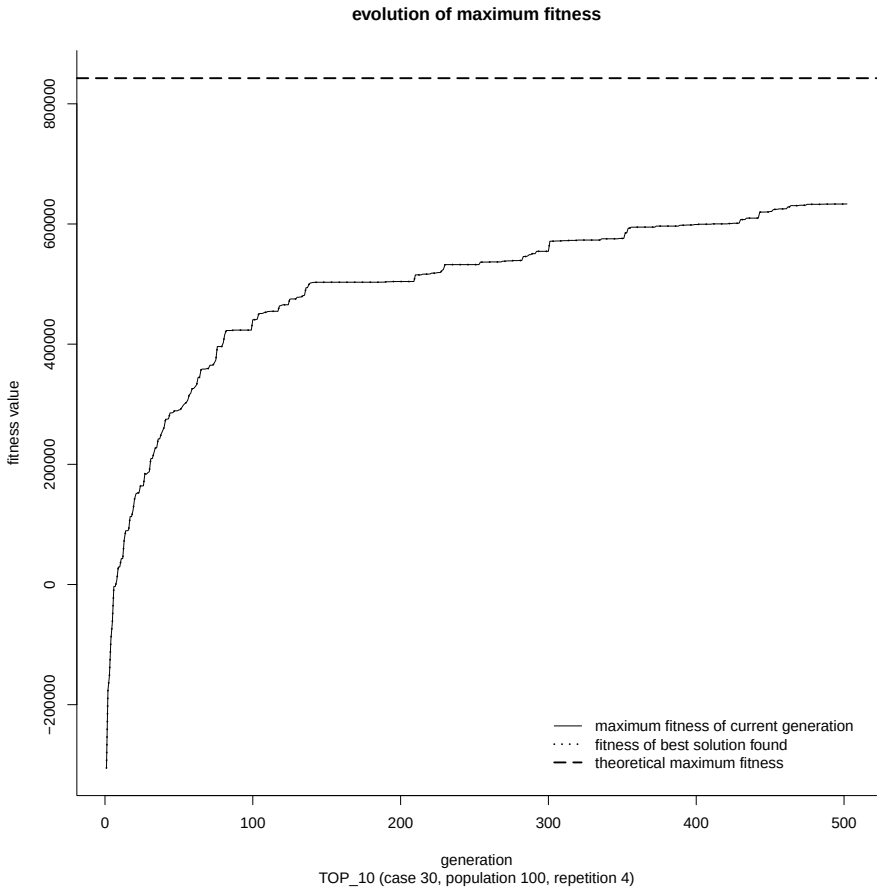

Fig. 90. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

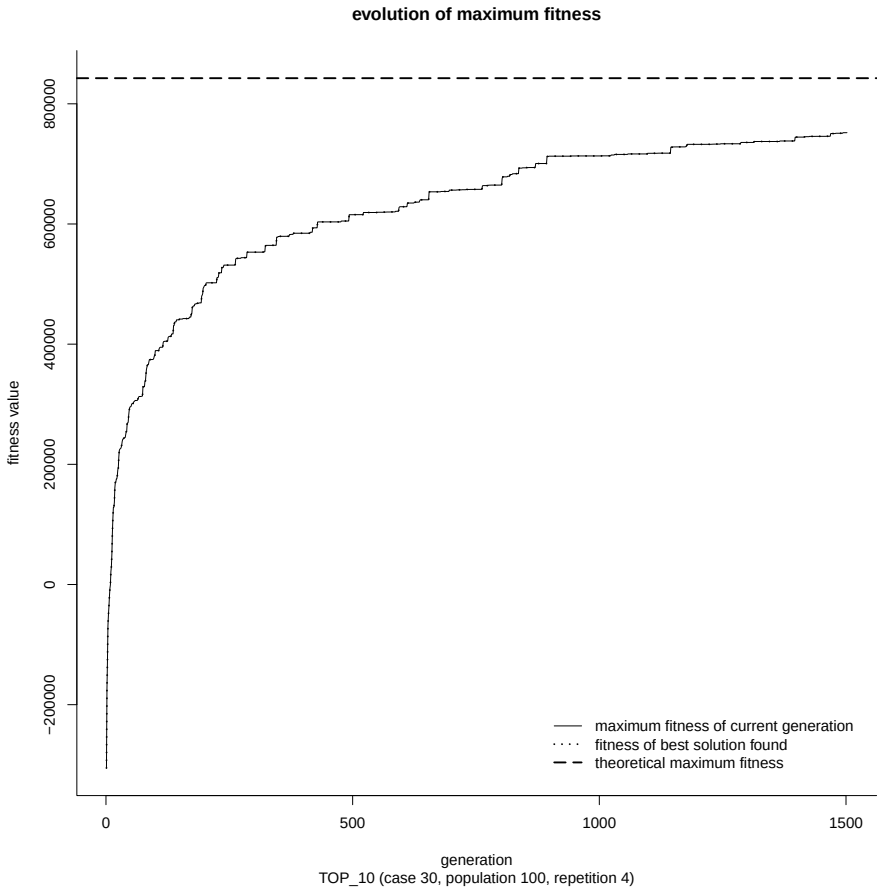

Fig. 91. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

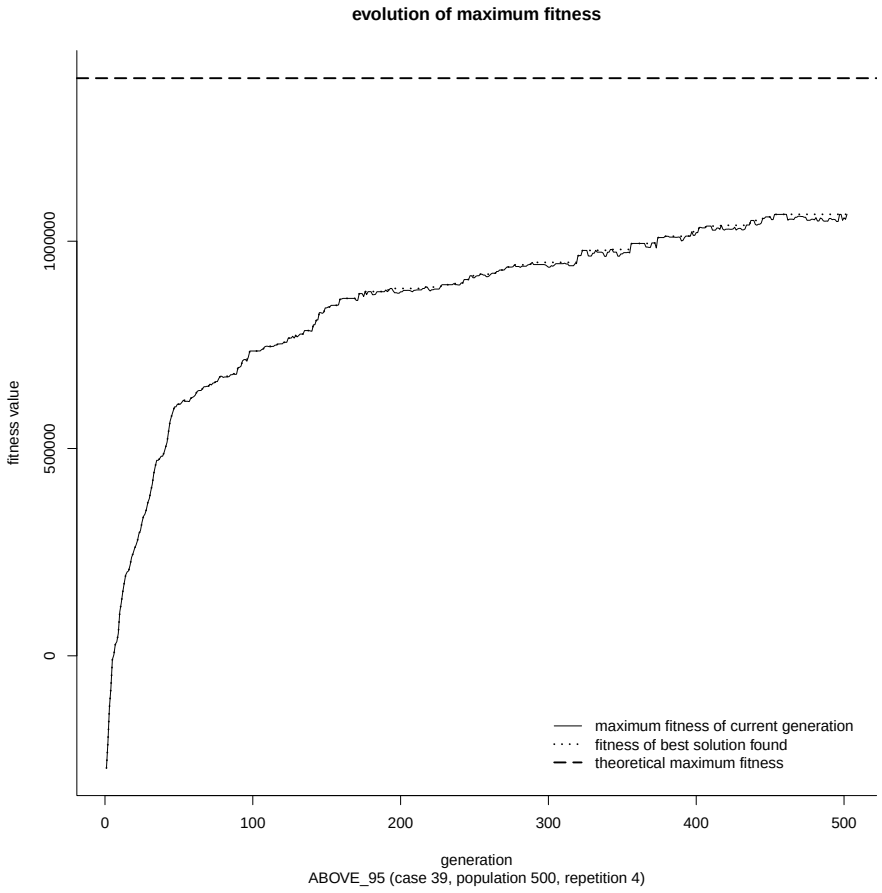

Fig. 92. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

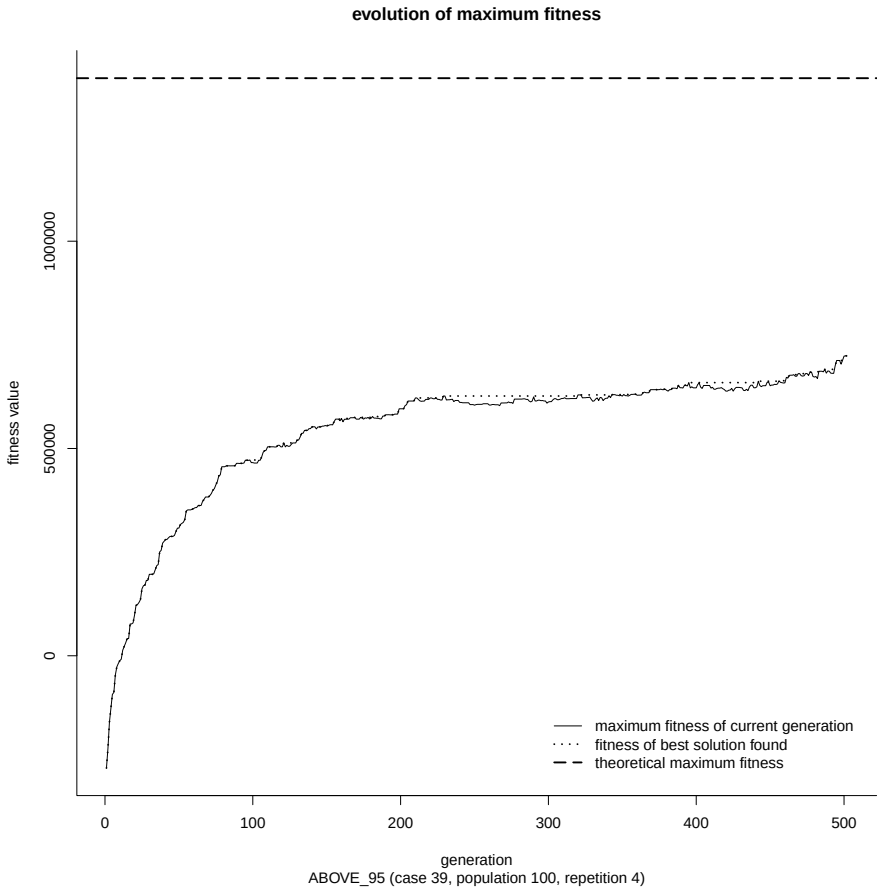

Fig. 93. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

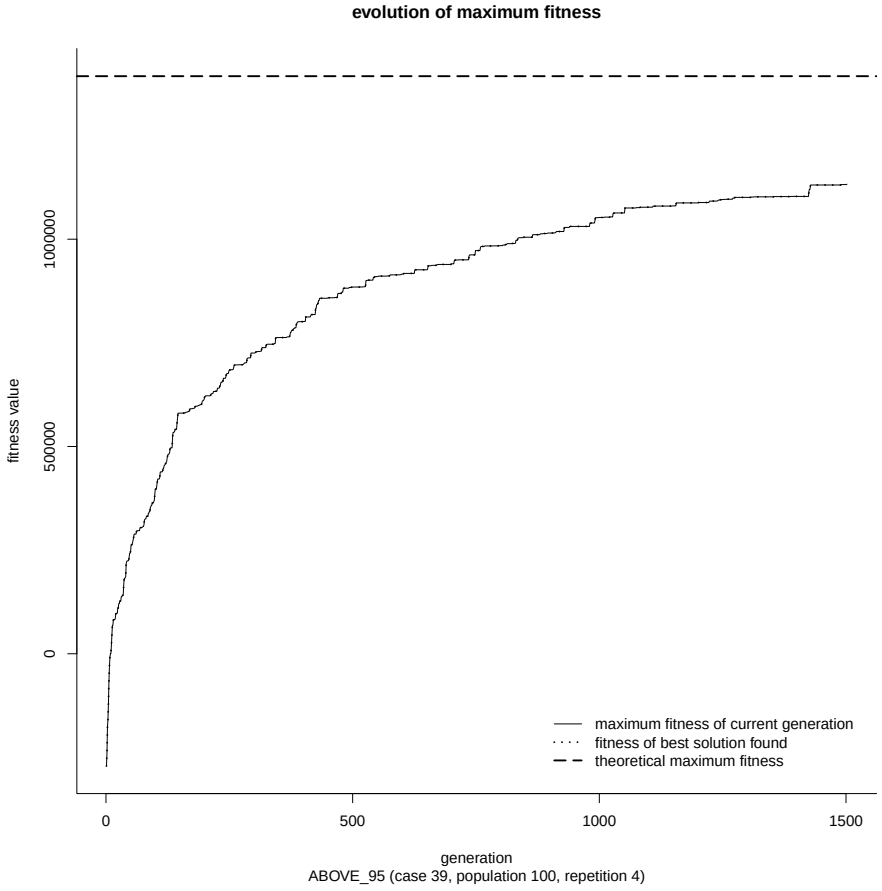

Fig. 94. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

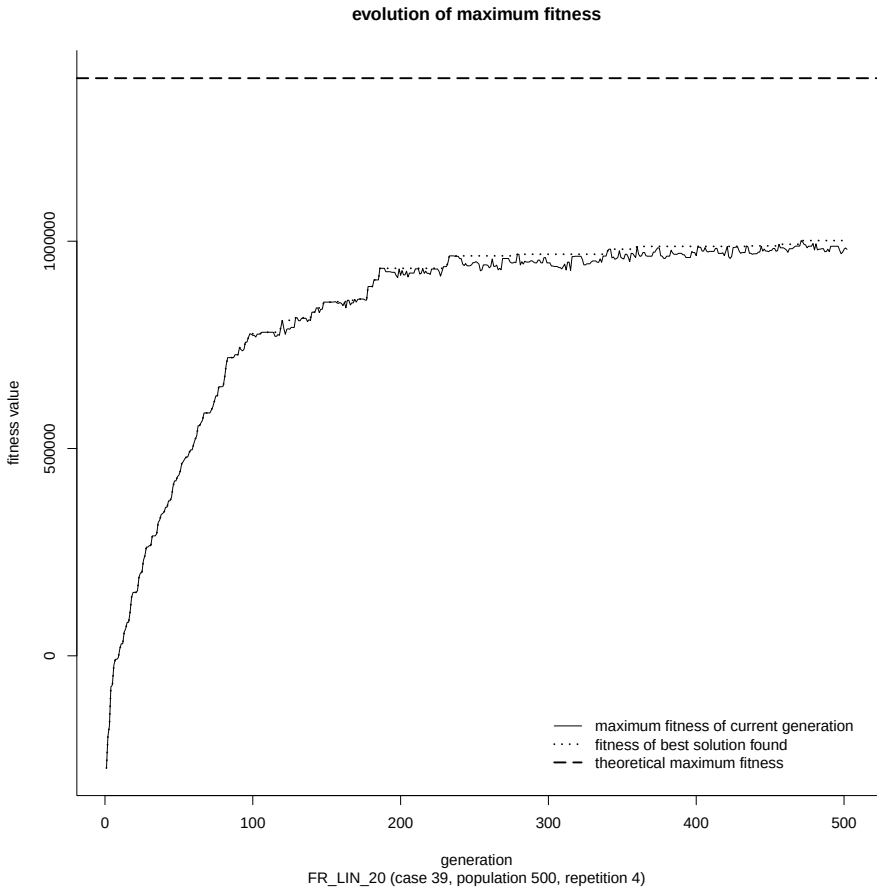

Fig. 95. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

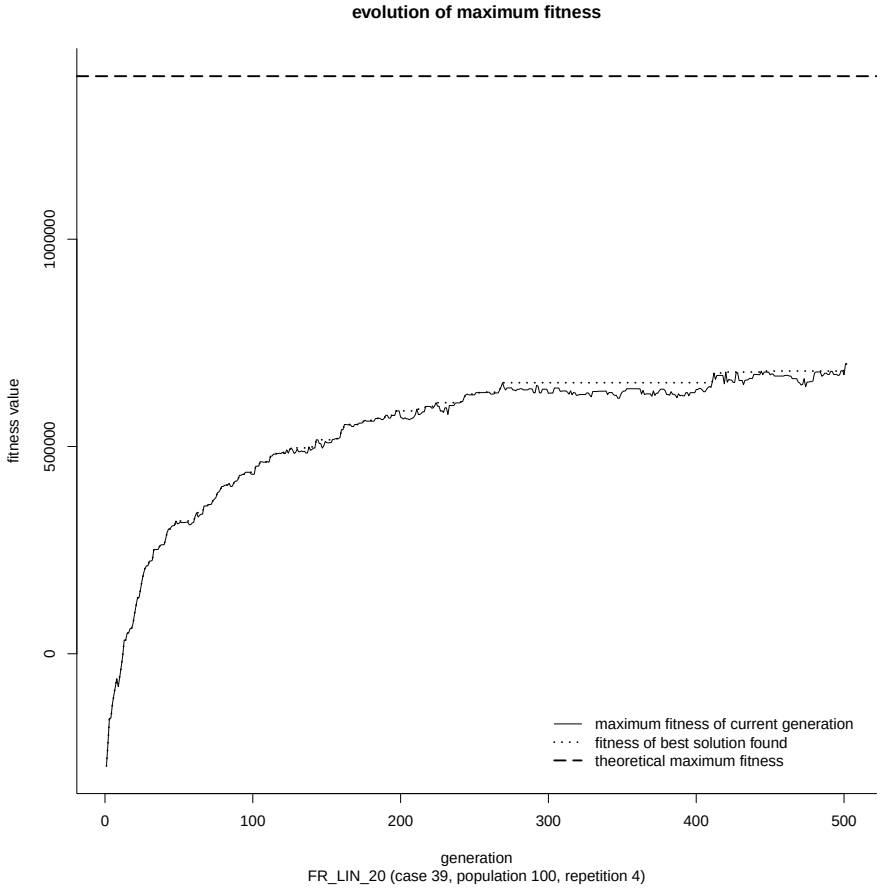

Fig. 96. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

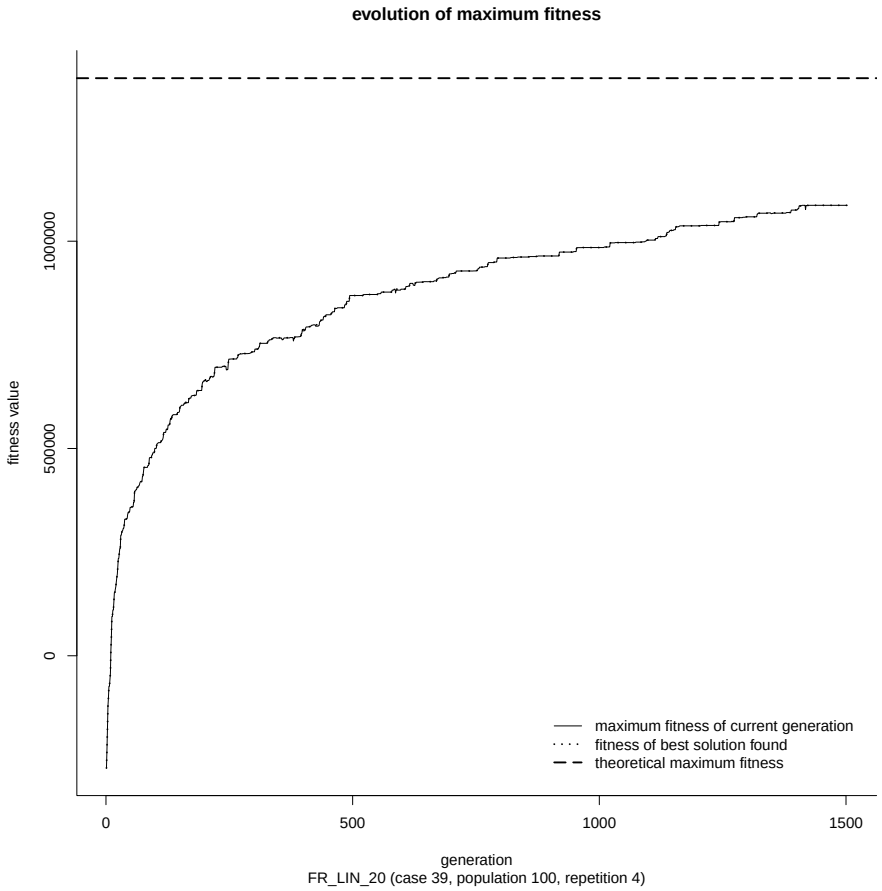

Fig. 97. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

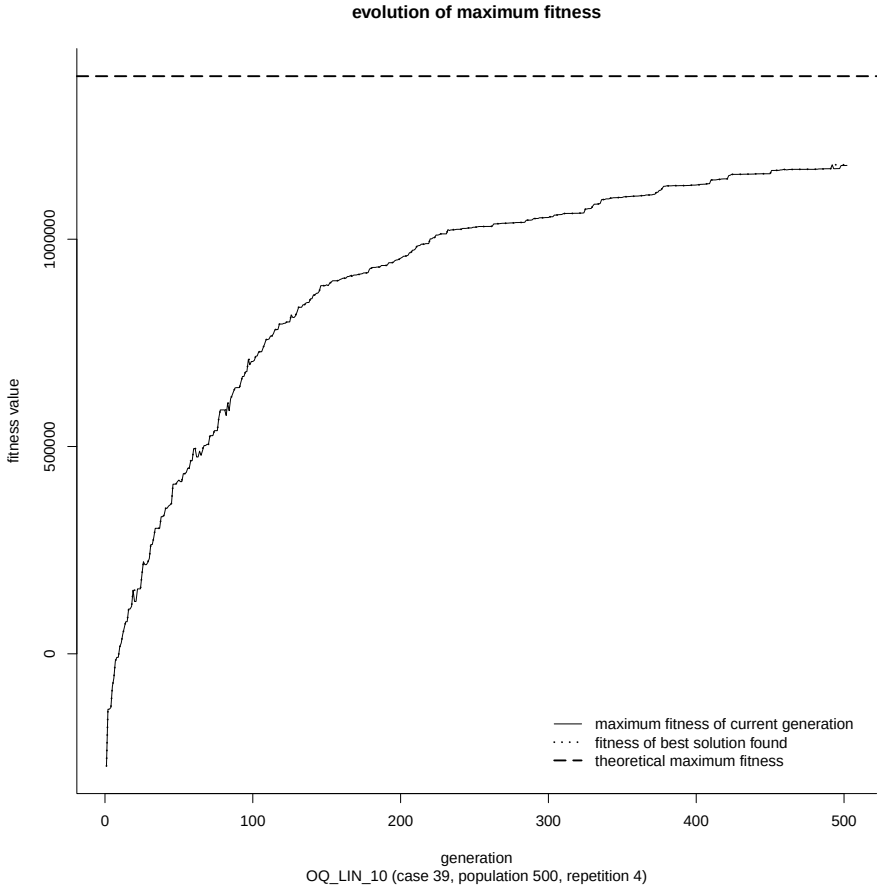

Fig. 98. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

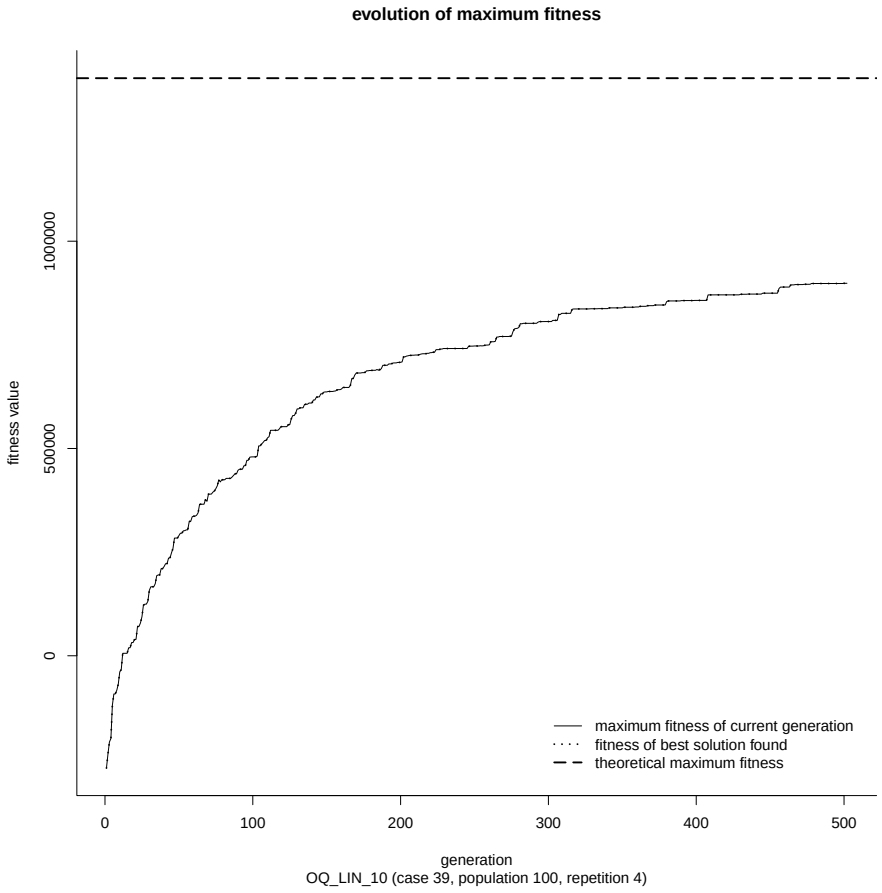

Fig. 99. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

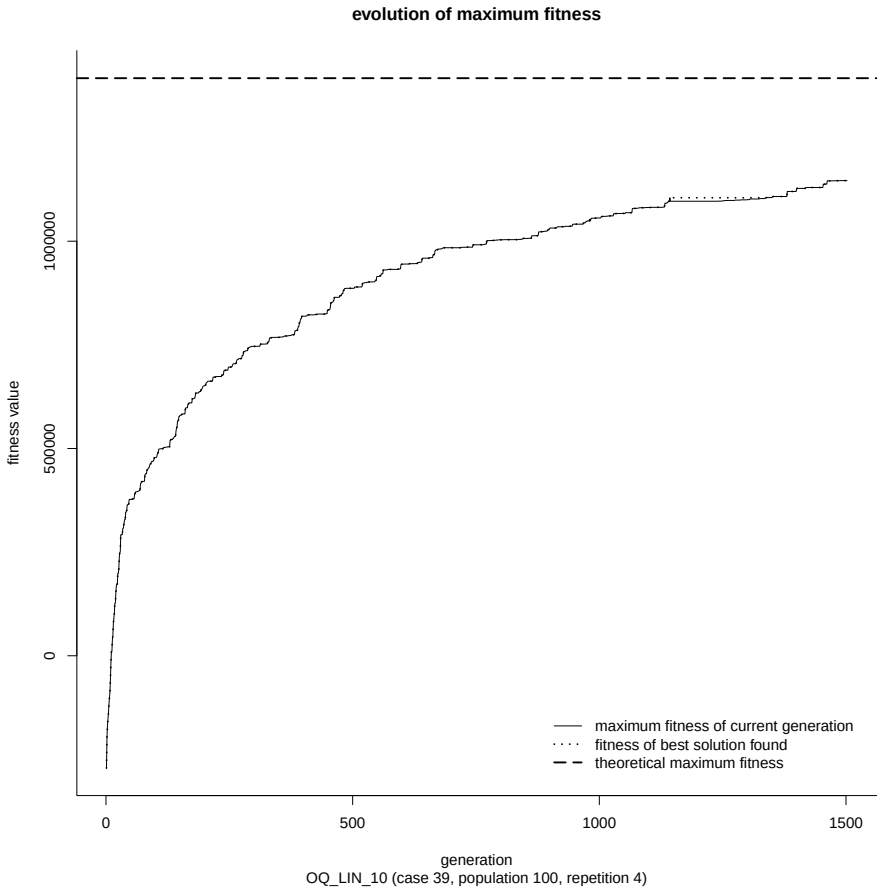

Fig. 100. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

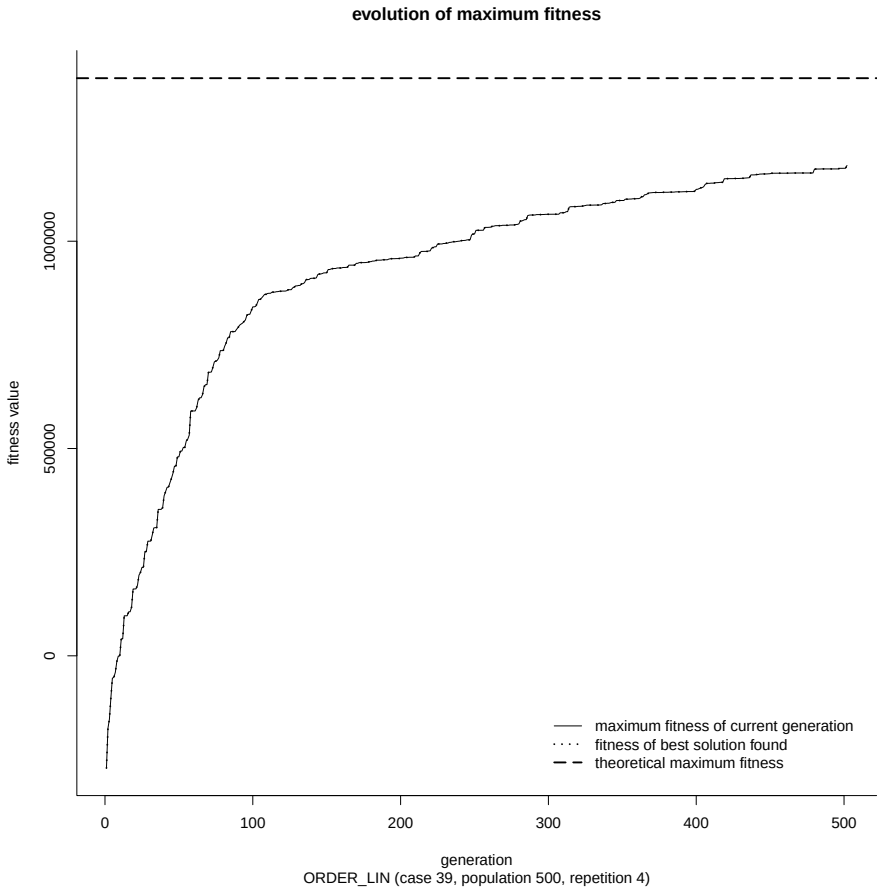

Fig. 101. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

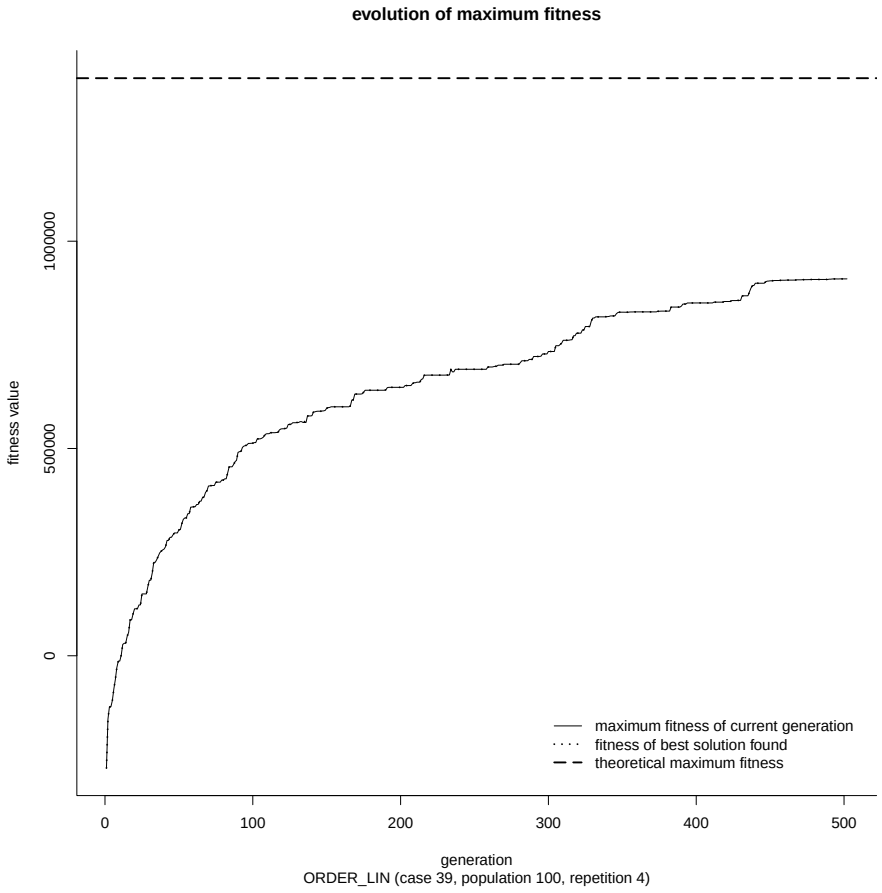

Fig. 102. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

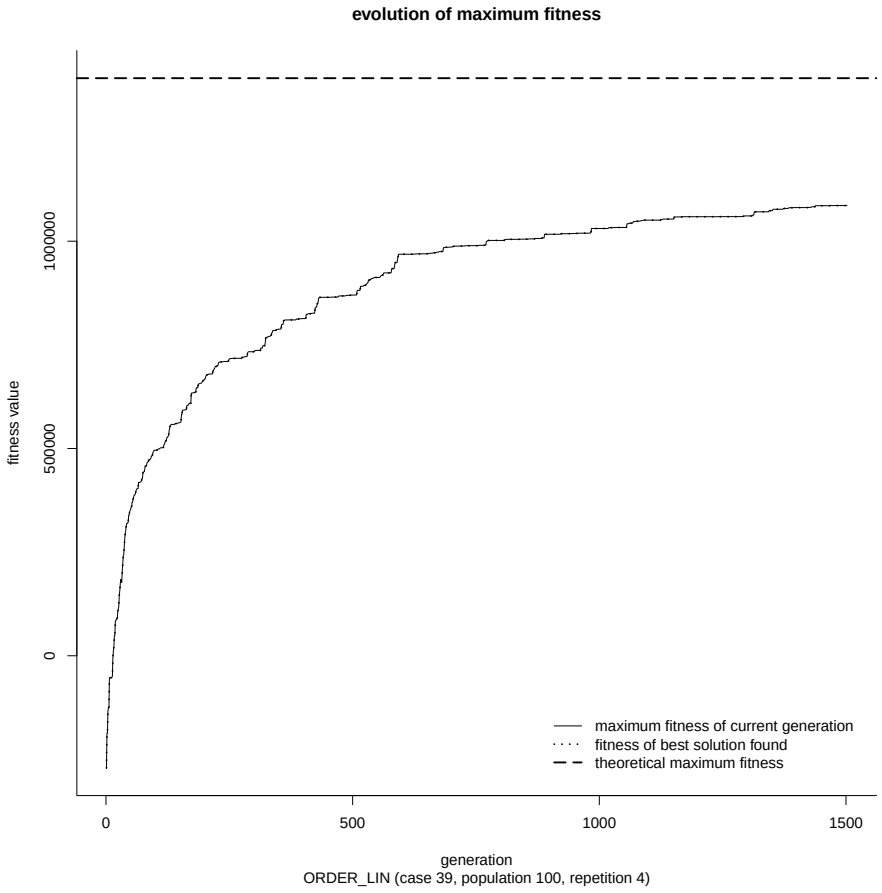

Fig. 103. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

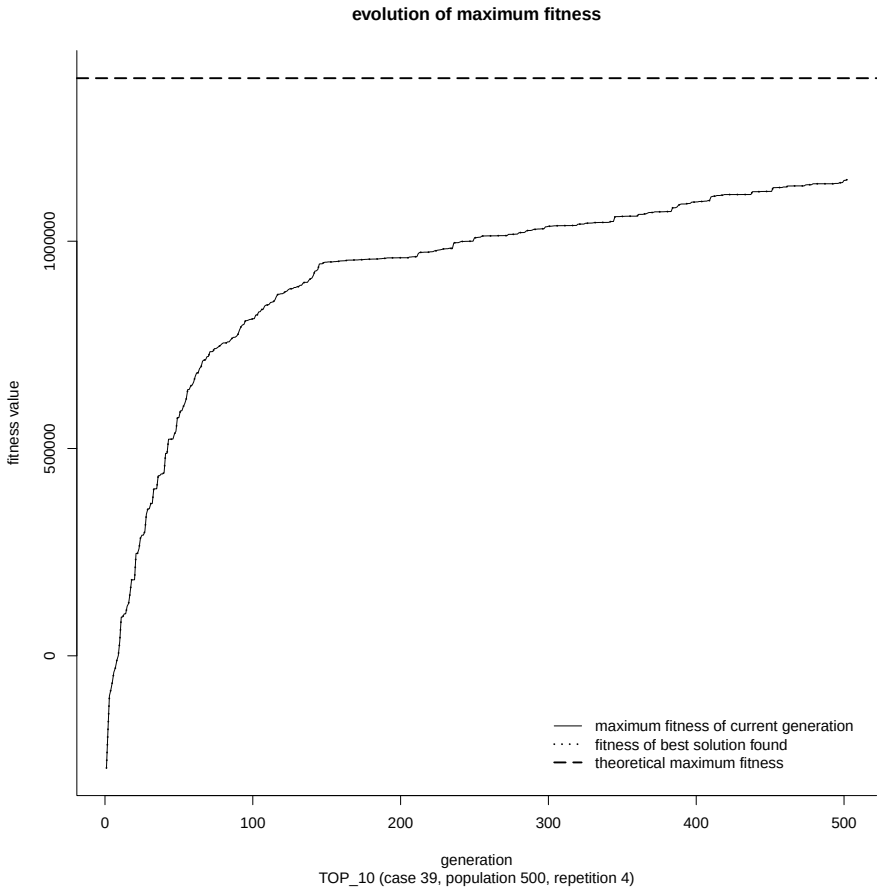

Fig. 104. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

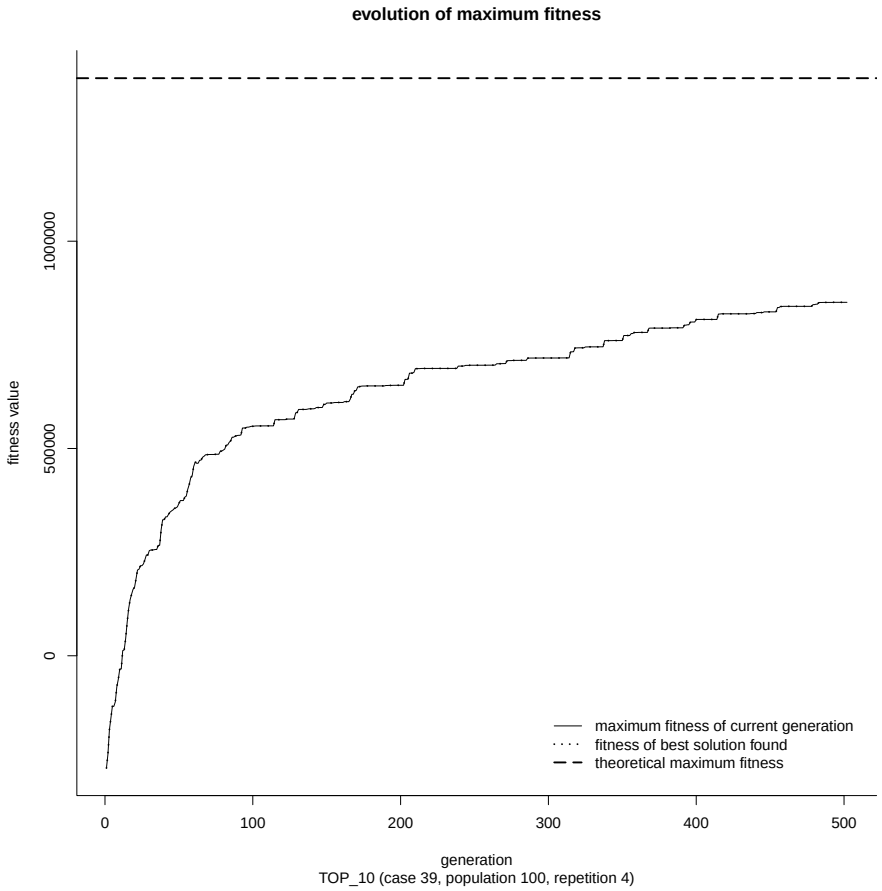

Fig. 105. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

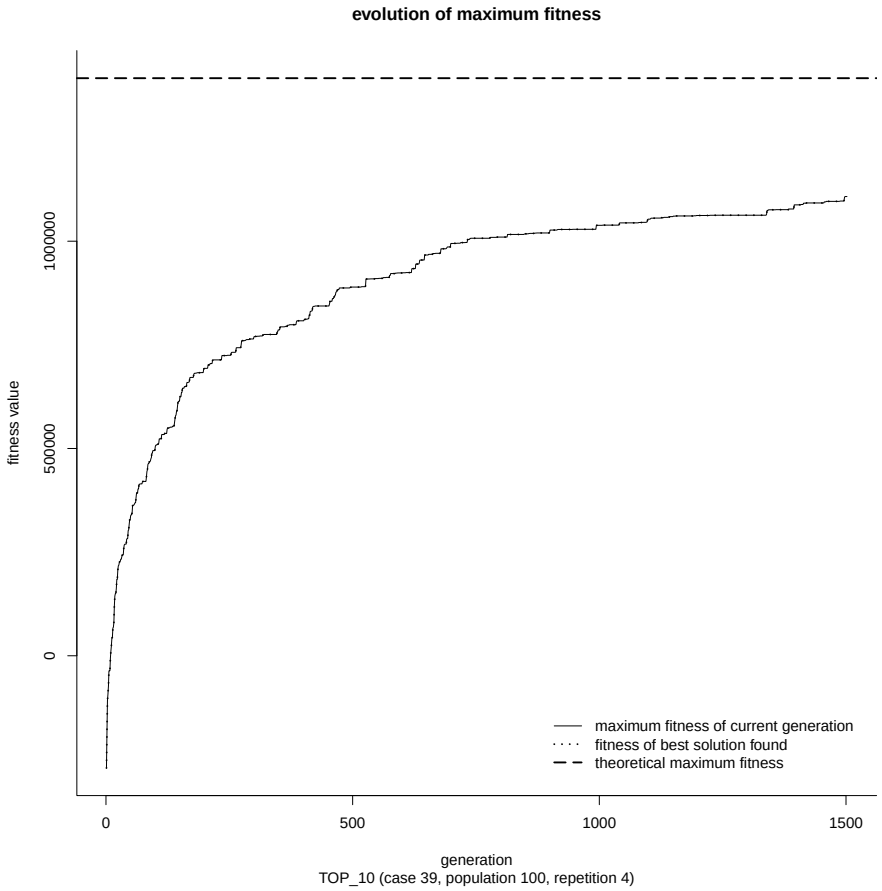

Fig. 106. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

2.5 Run 4

This run has been designed to evaluate the effect of deduplication on the results of the optimization. Therefore, all settings are identical to the third run (see 2.4), except that deduplication has not been activated in this run.

Table 147. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_70			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	89.14%	*87.55%*	*90.61%*
29	87.81%	*83.20%*	*89.94%*
30	85.92%	*83.00%*	*88.64%*
31	84.97%	*83.10%*	*87.03%*
32	87.24%	*85.82%*	*88.22%*
33	86.83%	*85.04%*	*88.82%*
34	86.54%	*85.00%*	*88.58%*
35	85.72%	*82.15%*	*89.73%*
36	87.88%	*86.55%*	*89.78%*
37	85.60%	*82.66%*	*88.35%*
38	76.39%	*74.07%*	*77.98%*
39	74.22%	*71.95%*	*78.54%*
40	78.44%	*76.95%*	*81.23%*
41	75.58%	*73.46%*	*78.05%*
42	74.24%	*72.44%*	*77.85%*
43	76.41%	*74.38%*	*79.29%*
44	75.77%	*73.70%*	*79.59%*
45	74.98%	*73.58%*	*77.55%*
46	76.34%	*72.77%*	*79.34%*
47	77.63%	*76.14%*	*78.33%*

Table 148. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_70						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	449	762	986	1248	-	-
29	604	874	1186	-	-	-
30	700	953	1291	-	-	-
31	709	1022	1314	-	-	-
32	636	927	1305	-	-	-
33	623	877	1257	-	-	-
34	623	916	1199	-	-	-
35	695	1000	1251	-	-	-
36	518	764	1119	-	-	-
37	714	1007	1286	-	-	-
38	1312	-	-	-	-	-
39	1348	-	-	-	-	-
40	1193	1398	-	-	-	-
41	1296	-	-	-	-	-
42	1242	-	-	-	-	-
43	1328	-	-	-	-	-
44	1242	-	-	-	-	-
45	1377	-	-	-	-	-
46	1266	-	-	-	-	-
47	1317	-	-	-	-	-

Table 149. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ABOVE_70	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.88
29	16.45
30	16.47
31	16.52
32	16.39
33	16.27
34	16.43
35	16.51
36	16.55
37	16.48
38	30.59
39	31.27
40	30.86
41	30.51
42	30.68
43	30.56
44	30.86
45	30.83
46	30.63
47	30.96

Table 150. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_80			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	92.48%	*91.40%*	*94.27%*
29	88.63%	*85.97%*	*89.94%*
30	87.40%	*85.79%*	*89.24%*
31	85.54%	*84.10%*	*86.97%*
32	89.36%	*87.20%*	*92.65%*
33	89.06%	*84.79%*	*91.25%*
34	86.11%	*83.88%*	*88.85%*
35	88.97%	*88.15%*	*90.13%*
36	86.36%	*84.87%*	*87.22%*
37	87.06%	*85.56%*	*88.39%*
38	76.92%	*76.09%*	*77.34%*
39	75.69%	*73.79%*	*77.90%*
40	77.03%	*74.96%*	*79.61%*
41	78.53%	*75.48%*	*81.57%*
42	76.65%	*75.09%*	*78.75%*
43	77.99%	*75.56%*	*80.69%*
44	78.36%	*77.61%*	*79.86%*
45	78.91%	*75.96%*	*81.39%*
46	77.24%	*73.25%*	*80.15%*
47	78.38%	*75.42%*	*80.75%*

Table 151. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_80						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	412	608	755	1123	-	-
29	451	689	974	-	-	-
30	611	897	1267	-	-	-
31	658	934	1248	-	-	-
32	621	862	1124	1283	-	-
33	500	722	1125	1380	-	-
34	499	704	987	-	-	-
35	439	633	909	1353	-	-
36	474	756	1119	-	-	-
37	622	864	1270	-	-	-
38	1251	-	-	-	-	-
39	1413	-	-	-	-	-
40	1195	-	-	-	-	-
41	1241	1405	-	-	-	-
42	1295	-	-	-	-	-
43	1128	1326	-	-	-	-
44	1217	-	-	-	-	-
45	1087	1427	-	-	-	-
46	1165	1456	-	-	-	-
47	1128	1333	-	-	-	-

Table 152. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ABOVE_80	
	pop. 100
case #	**1500 gen.**
	avg. time
28	26.41
29	26.45
30	26.41
31	26.51
32	26.52
33	26.40
34	26.36
35	26.41
36	26.31
37	26.61
38	52.61
39	52.77
40	52.85
41	54.89
42	53.71
43	52.60
44	52.89
45	52.61
46	52.49
47	52.44

Table 153. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_90			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	90.64%	*88.59%*	*91.70%*
29	87.82%	*84.99%*	*88.90%*
30	85.27%	*84.24%*	*86.50%*
31	83.50%	*79.00%*	*87.95%*
32	86.72%	*84.92%*	*88.22%*
33	88.01%	*86.33%*	*91.83%*
34	85.72%	*82.06%*	*87.78%*
35	87.15%	*85.25%*	*88.61%*
36	86.00%	*84.77%*	*86.97%*
37	85.96%	*81.47%*	*88.89%*
38	75.85%	*74.76%*	*76.81%*
39	75.05%	*73.89%*	*77.13%*
40	76.68%	*74.90%*	*79.23%*
41	75.04%	*71.44%*	*77.67%*
42	76.36%	*74.29%*	*77.27%*
43	75.54%	*74.09%*	*78.86%*
44	75.51%	*73.49%*	*76.94%*
45	74.63%	*72.72%*	*76.65%*
46	73.58%	*70.37%*	*77.18%*
47	78.78%	*76.15%*	*81.18%*

Table 154. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_90						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	446	614	854	1246	-	-
29	604	822	1145	-	-	-
30	680	970	1328	-	-	-
31	757	1147	1207	-	-	-
32	565	824	1275	-	-	-
33	584	835	1191	1384	-	-
34	689	986	1318	-	-	-
35	595	836	1210	-	-	-
36	604	886	1302	-	-	-
37	615	927	1258	-	-	-
38	1340	-	-	-	-	-
39	1307	-	-	-	-	-
40	1193	-	-	-	-	-
41	1271	-	-	-	-	-
42	1352	-	-	-	-	-
43	1171	-	-	-	-	-
44	1305	-	-	-	-	-
45	1268	-	-	-	-	-
46	1279	-	-	-	-	-
47	1228	1452	-	-	-	-

Table 155. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ABOVE_90	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.67
29	16.29
30	16.14
31	16.26
32	16.38
33	16.26
34	16.20
35	16.14
36	16.19
37	16.28
38	30.40
39	30.45
40	30.45
41	30.48
42	30.82
43	31.10
44	31.17
45	30.76
46	31.08
47	30.59

Table 156. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_95			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	90.56%	*88.24%*	*92.52%*
29	88.21%	*85.14%*	*91.57%*
30	84.87%	*83.39%*	*86.09%*
31	87.07%	*85.38%*	*89.56%*
32	87.43%	*86.62%*	*89.20%*
33	86.31%	*83.81%*	*88.81%*
34	86.57%	*81.88%*	*89.02%*
35	88.62%	*85.48%*	*91.58%*
36	88.16%	*84.24%*	*90.38%*
37	86.76%	*83.96%*	*88.68%*
38	75.84%	*73.60%*	*78.61%*
39	74.23%	*72.67%*	*75.98%*
40	75.72%	*74.09%*	*76.83%*
41	77.01%	*74.62%*	*79.69%*
42	74.55%	*71.90%*	*75.60%*
43	74.47%	*70.63%*	*77.56%*
44	76.34%	*75.70%*	*77.59%*
45	76.60%	*74.86%*	*78.08%*
46	74.55%	*72.75%*	*76.29%*
47	78.18%	*75.78%*	*81.42%*

Table 157. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ABOVE_95						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	434	597	862	1260	-	-
29	616	823	1214	1456	-	-
30	667	943	1378	-	-	-
31	725	932	1317	-	-	-
32	609	797	1215	-	-	-
33	625	882	1167	-	-	-
34	547	837	1091	-	-	-
35	632	855	1169	1114	-	-
36	532	780	1110	1410	-	-
37	581	835	1328	-	-	-
38	1262	-	-	-	-	-
39	1397	-	-	-	-	-
40	1360	-	-	-	-	-
41	1353	-	-	-	-	-
42	1438	-	-	-	-	-
43	1270	-	-	-	-	-
44	1341	-	-	-	-	-
45	1220	-	-	-	-	-
46	1411	-	-	-	-	-
47	1220	1415	-	-	-	-

Table 158. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ABOVE_95	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.31
29	16.20
30	16.25
31	16.11
32	16.10
33	16.21
34	16.39
35	16.70
36	16.51
37	16.35
38	31.88
39	31.29
40	31.46
41	31.29
42	31.24
43	30.99
44	30.51
45	31.04
46	31.21
47	31.34

Table 159. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_5			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	89.40%	*87.14%*	*91.15%*
29	88.93%	*86.55%*	*91.43%*
30	86.17%	*83.45%*	*89.98%*
31	84.37%	*82.86%*	*86.54%*
32	88.26%	*86.23%*	*90.12%*
33	87.03%	*85.12%*	*91.48%*
34	86.39%	*85.64%*	*87.31%*
35	87.04%	*86.47%*	*87.94%*
36	87.36%	*86.05%*	*89.31%*
37	86.22%	*82.73%*	*87.52%*
38	75.91%	*74.22%*	*77.96%*
39	75.10%	*73.26%*	*77.89%*
40	75.38%	*74.39%*	*78.12%*
41	76.66%	*74.62%*	*79.74%*
42	76.45%	*74.14%*	*78.01%*
43	76.84%	*74.16%*	*79.64%*
44	75.34%	*73.02%*	*77.31%*
45	76.16%	*73.17%*	*79.08%*
46	74.25%	*72.53%*	*77.06%*
47	78.11%	*76.86%*	*78.89%*

Table 160. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_5						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	449	665	939	1455	-	-
29	544	788	1115	1449	-	-
30	673	966	1189	-	-	-
31	702	1027	1320	-	-	-
32	553	720	1019	1481	-	-
33	580	820	1297	1290	-	-
34	586	848	1347	-	-	-
35	619	841	1215	-	-	-
36	574	803	1255	-	-	-
37	618	887	1233	-	-	-
38	1358	-	-	-	-	-
39	1312	-	-	-	-	-
40	1390	-	-	-	-	-
41	1302	-	-	-	-	-
42	1236	-	-	-	-	-
43	1102	-	-	-	-	-
44	1332	-	-	-	-	-
45	1242	-	-	-	-	-
46	1400	-	-	-	-	-
47	1205	-	-	-	-	-

Table 161. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

FR_LIN_5	
	pop. 100
case #	**1500 gen.**
	avg. time
28	25.63
29	25.25
30	25.48
31	25.36
32	25.28
33	25.27
34	25.25
35	25.35
36	25.34
37	25.39
38	51.54
39	51.02
40	51.18
41	50.67
42	51.96
43	50.57
44	50.42
45	51.30
46	50.76
47	50.54

Table 162. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_7			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	89.86%	88.47%	91.85%
29	86.27%	83.20%	88.68%
30	88.81%	86.03%	92.14%
31	84.88%	80.73%	89.21%
32	87.90%	86.23%	90.67%
33	86.18%	84.65%	89.54%
34	87.87%	84.58%	90.76%
35	87.05%	83.37%	90.78%
36	88.75%	86.19%	91.05%
37	85.10%	82.59%	88.13%
38	76.41%	74.88%	79.10%
39	74.67%	73.37%	76.80%
40	77.58%	74.94%	81.10%
41	76.77%	72.37%	78.91%
42	76.70%	73.63%	80.43%
43	75.87%	73.89%	78.24%
44	75.53%	73.48%	78.21%
45	75.05%	71.24%	78.09%
46	76.29%	74.99%	77.51%
47	78.36%	77.11%	79.35%

Table 163. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_7						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	406	583	867	1213	-	-
29	620	888	1082	-	-	-
30	646	836	1112	1389	-	-
31	725	1049	1332	-	-	-
32	535	777	1170	1442	-	-
33	664	1004	1274	-	-	-
34	588	729	960	1487	-	-
35	649	890	1246	1466	-	-
36	516	684	1038	1321	-	-
37	682	965	1291	-	-	-
38	1175	-	-	-	-	-
39	1346	-	-	-	-	-
40	1225	1387	-	-	-	-
41	1222	-	-	-	-	-
42	1303	1444	-	-	-	-
43	1338	-	-	-	-	-
44	1352	-	-	-	-	-
45	1313	-	-	-	-	-
46	1326	-	-	-	-	-
47	1122	-	-	-	-	-

Table 164. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

FR_LIN_7	
	pop. 100
case #	**1500 gen.**
	avg. time
28	25.30
29	25.81
30	25.65
31	25.32
32	25.31
33	25.81
34	25.71
35	25.57
36	26.27
37	25.20
38	50.90
39	50.50
40	50.55
41	50.48
42	50.84
43	51.39
44	52.38
45	50.89
46	50.67
47	50.85

Table 165. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_10			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	90.03%	*88.60%*	*92.41%*
29	87.11%	*85.17%*	*90.67%*
30	86.68%	*85.26%*	*89.01%*
31	84.60%	*79.80%*	*86.85%*
32	87.62%	*85.55%*	*89.03%*
33	89.62%	*85.82%*	*93.75%*
34	84.88%	*81.93%*	*86.26%*
35	85.39%	*82.71%*	*88.05%*
36	87.27%	*86.17%*	*89.20%*
37	87.81%	*86.43%*	*88.70%*
38	75.62%	*73.49%*	*77.55%*
39	75.09%	*73.41%*	*76.38%*
40	76.90%	*75.35%*	*77.74%*
41	74.94%	*70.85%*	*78.45%*
42	76.46%	*73.67%*	*79.14%*
43	76.27%	*74.80%*	*77.93%*
44	76.17%	*73.25%*	*79.81%*
45	77.02%	*74.68%*	*79.38%*
46	75.45%	*71.46%*	*79.25%*
47	78.65%	*75.39%*	*81.40%*

Table 166. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_10						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	446	600	889	1293	-	-
29	605	795	1131	1359	-	-
30	644	848	1214	-	-	-
31	681	920	1316	-	-	-
32	548	803	1249	-	-	-
33	550	799	1076	1150	-	-
34	616	970	1280	-	-	-
35	601	873	1250	-	-	-
36	548	840	1291	-	-	-
37	605	863	1166	-	-	-
38	1398	-	-	-	-	-
39	1383	-	-	-	-	-
40	1285	-	-	-	-	-
41	1213	-	-	-	-	-
42	1197	-	-	-	-	-
43	1367	-	-	-	-	-
44	1274	-	-	-	-	-
45	1289	-	-	-	-	-
46	1291	-	-	-	-	-
47	1160	1398	-	-	-	-

Table 167. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

FR_LIN_10	
	pop. 100
case #	**1500 gen.**
	avg. time
28	25.83
29	25.33
30	25.32
31	25.68
32	26.37
33	25.84
34	25.79
35	25.36
36	25.38
37	25.37
38	50.91
39	51.46
40	50.59
41	50.58
42	51.54
43	52.74
44	52.60
45	51.67
46	51.94
47	52.53

Table 168. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_20			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	91.88%	*89.83%*	*93.69%*
29	88.77%	*87.83%*	*91.26%*
30	84.85%	*80.25%*	*89.49%*
31	85.20%	*83.55%*	*86.68%*
32	86.47%	*85.03%*	*88.42%*
33	87.26%	*85.41%*	*90.03%*
34	87.81%	*87.07%*	*88.77%*
35	86.85%	*85.97%*	*87.87%*
36	87.03%	*84.95%*	*90.64%*
37	87.94%	*84.29%*	*90.58%*
38	75.37%	*73.22%*	*78.50%*
39	74.39%	*71.65%*	*76.77%*
40	76.84%	*75.14%*	*77.94%*
41	75.95%	*72.54%*	*78.00%*
42	75.56%	*72.44%*	*77.39%*
43	75.82%	*72.41%*	*80.59%*
44	77.08%	*75.45%*	*81.37%*
45	76.37%	*73.92%*	*78.75%*
46	75.33%	*72.65%*	*76.12%*
47	78.58%	*76.43%*	*79.67%*

Table 169. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

FR_LIN_20						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	427	571	778	1084	-	-
29	566	839	1122	1370	-	-
30	678	1028	1323	-	-	-
31	649	964	1323	-	-	-
32	636	836	1278	-	-	-
33	643	859	1253	1457	-	-
34	578	842	1152	-	-	-
35	619	933	1323	-	-	-
36	536	840	1120	1377	-	-
37	661	852	1136	1464	-	-
38	1316	-	-	-	-	-
39	1374	-	-	-	-	-
40	1329	-	-	-	-	-
41	1289	-	-	-	-	-
42	1352	-	-	-	-	-
43	1295	1446	-	-	-	-
44	1253	1339	-	-	-	-
45	1305	-	-	-	-	-
46	1367	-	-	-	-	-
47	1203	-	-	-	-	-

Table 170. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

FR_LIN_20	
	pop. 100
case #	**1500 gen.**
	avg. time
28	25.75
29	25.45
30	25.51
31	26.15
32	25.84
33	25.64
34	25.46
35	25.39
36	25.42
37	25.51
38	51.87
39	51.11
40	51.51
41	51.31
42	50.62
43	51.64
44	52.73
45	50.64
46	50.84
47	50.51

Table 171. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ORDER_LIN			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	91.75%	*89.98%*	*93.62%*
29	87.31%	*84.70%*	*88.44%*
30	85.11%	*83.30%*	*87.64%*
31	83.54%	*81.15%*	*85.83%*
32	86.78%	*84.79%*	*89.03%*
33	86.70%	*84.99%*	*88.11%*
34	86.95%	*84.78%*	*89.60%*
35	87.13%	*84.15%*	*89.96%*
36	87.98%	*85.70%*	*91.30%*
37	87.05%	*84.43%*	*89.65%*
38	75.41%	*73.46%*	*77.13%*
39	73.29%	*71.91%*	*75.24%*
40	77.92%	*74.40%*	*82.09%*
41	77.20%	*74.92%*	*79.87%*
42	76.69%	*75.94%*	*77.12%*
43	76.17%	*73.07%*	*78.05%*
44	75.76%	*74.52%*	*76.81%*
45	74.90%	*73.96%*	*75.57%*
46	75.49%	*73.43%*	*78.51%*
47	78.46%	*75.23%*	*81.83%*

Table 172. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ORDER_LIN						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	348	499	710	1159	-	-
29	564	752	1137	-	-	-
30	729	979	1106	-	-	-
31	685	1065	1465	-	-	-
32	555	847	1174	-	-	-
33	630	869	1228	-	-	-
34	562	809	1291	-	-	-
35	618	819	1190	-	-	-
36	568	859	1150	1270	-	-
37	549	849	1278	-	-	-
38	1320	-	-	-	-	-
39	1460	-	-	-	-	-
40	1128	1344	-	-	-	-
41	1225	-	-	-	-	-
42	1273	-	-	-	-	-
43	1293	-	-	-	-	-
44	1383	-	-	-	-	-
45	1471	-	-	-	-	-
46	1269	-	-	-	-	-
47	1147	1181	-	-	-	-

Table 173. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ORDER_LIN	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.24
29	16.07
30	16.06
31	16.07
32	16.19
33	16.23
34	16.14
35	16.22
36	16.48
37	16.19
38	30.38
39	30.27
40	30.32
41	30.23
42	30.24
43	30.47
44	30.66
45	30.47
46	30.39
47	30.60

Table 174. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ORDER_LOG			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	90.75%	*87.59%*	*93.25%*
29	88.32%	*87.86%*	*88.77%*
30	85.93%	*85.63%*	*86.28%*
31	84.99%	*81.16%*	*87.73%*
32	87.92%	*85.30%*	*89.25%*
33	86.68%	*85.12%*	*87.54%*
34	86.79%	*85.89%*	*89.05%*
35	87.97%	*82.59%*	*90.90%*
36	87.14%	*85.35%*	*88.66%*
37	87.02%	*84.72%*	*88.74%*
38	78.37%	*77.31%*	*79.79%*
39	74.77%	*72.27%*	*77.26%*
40	76.05%	*71.10%*	*78.27%*
41	76.28%	*73.25%*	*78.38%*
42	75.73%	*72.35%*	*78.98%*
43	76.26%	*72.32%*	*78.84%*
44	75.86%	*71.11%*	*79.37%*
45	78.32%	*75.51%*	*81.23%*
46	76.21%	*74.52%*	*77.90%*
47	79.20%	*76.92%*	*81.26%*

Table 175. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

ORDER_LOG						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	385	548	883	1234	-	-
29	545	749	1092	-	-	-
30	656	880	1311	-	-	-
31	607	942	1145	-	-	-
32	616	819	1118	-	-	-
33	653	890	1262	-	-	-
34	557	830	1218	-	-	-
35	574	778	962	1362	-	-
36	487	637	1055	-	-	-
37	682	910	1232	-	-	-
38	1167	-	-	-	-	-
39	1285	-	-	-	-	-
40	1275	-	-	-	-	-
41	1300	-	-	-	-	-
42	1255	-	-	-	-	-
43	1195	-	-	-	-	-
44	1170	-	-	-	-	-
45	1214	1437	-	-	-	-
46	1334	-	-	-	-	-
47	1109	1376	-	-	-	-

Table 176. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

ORDER_LOG	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.19
29	16.28
30	16.44
31	16.56
32	16.46
33	16.61
34	16.53
35	16.77
36	16.50
37	16.29
38	30.30
39	30.19
40	30.38
41	30.46
42	31.02
43	30.32
44	30.48
45	30.48
46	30.98
47	30.30

Table 177. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_5			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	88.85%	*87.80%*	*89.68%*
29	86.85%	*82.02%*	*90.62%*
30	84.62%	*82.70%*	*86.13%*
31	84.17%	*83.07%*	*85.48%*
32	87.07%	*84.50%*	*88.99%*
33	86.06%	*83.67%*	*88.73%*
34	86.51%	*83.59%*	*90.01%*
35	87.06%	*85.73%*	*88.32%*
36	87.86%	*85.62%*	*89.01%*
37	87.77%	*86.76%*	*89.21%*
38	75.54%	*72.80%*	*78.03%*
39	74.54%	*71.87%*	*77.68%*
40	76.43%	*74.87%*	*78.08%*
41	76.89%	*76.53%*	*77.98%*
42	75.67%	*73.66%*	*78.73%*
43	76.04%	*74.71%*	*77.30%*
44	77.62%	*71.59%*	*82.99%*
45	76.22%	*74.03%*	*78.32%*
46	74.26%	*72.51%*	*77.02%*
47	78.01%	*76.69%*	*78.60%*

Table 178. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_5						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	382	608	1009	-	-	-
29	626	938	924	1384	-	-
30	716	1020	1337	-	-	-
31	726	1017	1384	-	-	-
32	636	872	1070	-	-	-
33	684	942	1153	-	-	-
34	618	870	1263	1495	-	-
35	653	904	1289	-	-	-
36	549	817	1186	-	-	-
37	617	817	1188	-	-	-
38	1183	-	-	-	-	-
39	1309	-	-	-	-	-
40	1304	-	-	-	-	-
41	1317	-	-	-	-	-
42	1201	-	-	-	-	-
43	1368	-	-	-	-	-
44	1157	1325	-	-	-	-
45	1205	-	-	-	-	-
46	1365	-	-	-	-	-
47	1150	-	-	-	-	-

Table 179. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

OQ_LIN_5	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.69
29	16.65
30	16.69
31	16.60
32	16.52
33	16.23
34	16.19
35	16.11
36	16.19
37	16.19
38	30.34
39	30.19
40	30.31
41	30.43
42	30.94
43	30.40
44	30.48
45	30.23
46	30.29
47	30.23

Table 180. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_7			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	88.75%	*86.62%*	*90.35%*
29	86.97%	*83.40%*	*91.18%*
30	85.34%	*82.51%*	*89.28%*
31	84.61%	*82.79%*	*87.85%*
32	87.81%	*86.06%*	*90.23%*
33	87.24%	*85.22%*	*89.91%*
34	87.60%	*85.57%*	*90.39%*
35	87.30%	*85.15%*	*90.30%*
36	85.91%	*84.85%*	*87.86%*
37	87.49%	*84.23%*	*89.90%*
38	74.56%	*70.97%*	*77.07%*
39	73.45%	*72.41%*	*74.77%*
40	76.43%	*74.75%*	*78.87%*
41	75.53%	*71.82%*	*79.78%*
42	75.62%	*73.94%*	*78.95%*
43	75.84%	*73.01%*	*78.24%*
44	73.89%	*72.11%*	*75.81%*
45	75.64%	*73.93%*	*78.49%*
46	74.93%	*71.91%*	*77.58%*
47	78.94%	*77.53%*	*80.42%*

Table 181. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_7						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	404	635	1046	1455	-	-
29	568	811	1057	1347	-	-
30	737	969	1317	-	-	-
31	786	1119	1380	-	-	-
32	550	777	1097	1403	-	-
33	551	765	1186	-	-	-
34	630	821	1208	1293	-	-
35	646	888	1312	1498	-	-
36	501	824	1289	-	-	-
37	678	880	1135	-	-	-
38	1331	-	-	-	-	-
39	-	-	-	-	-	-
40	1308	-	-	-	-	-
41	1193	-	-	-	-	-
42	1226	-	-	-	-	-
43	1187	-	-	-	-	-
44	1372	-	-	-	-	-
45	1377	-	-	-	-	-
46	1375	-	-	-	-	-
47	1192	1466	-	-	-	-

Table 182. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

OQ_LIN_7	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.22
29	16.32
30	16.01
31	16.34
32	16.25
33	16.12
34	16.18
35	16.10
36	16.12
37	16.58
38	30.64
39	30.41
40	30.76
41	30.63
42	30.59
43	31.30
44	30.72
45	30.28
46	30.67
47	31.00

Table 183. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_10			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	89.91%	87.28%	92.53%
29	87.58%	86.65%	89.33%
30	85.22%	83.58%	87.37%
31	83.83%	82.33%	86.12%
32	86.36%	84.56%	90.05%
33	86.49%	85.08%	88.34%
34	86.79%	84.24%	89.09%
35	86.91%	84.18%	88.45%
36	86.34%	85.81%	87.16%
37	86.89%	84.65%	88.78%
38	75.75%	72.71%	78.59%
39	74.61%	73.26%	76.78%
40	76.98%	73.90%	81.60%
41	76.13%	74.61%	78.68%
42	75.91%	72.24%	77.44%
43	76.36%	73.64%	78.14%
44	75.59%	73.31%	78.66%
45	75.86%	72.81%	79.20%
46	75.75%	73.09%	76.89%
47	78.24%	75.39%	81.79%

Table 184. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

OQ_LIN_10						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	413	586	954	1305	-	-
29	605	725	1106	-	-	-
30	718	975	1265	-	-	-
31	778	1064	1113	-	-	-
32	652	851	1288	1467	-	-
33	637	945	1305	-	-	-
34	555	826	1104	-	-	-
35	652	904	1267	-	-	-
36	527	793	1195	-	-	-
37	742	966	1228	-	-	-
38	1216	-	-	-	-	-
39	1405	-	-	-	-	-
40	1262	1354	-	-	-	-
41	1363	-	-	-	-	-
42	1269	-	-	-	-	-
43	1297	-	-	-	-	-
44	1291	-	-	-	-	-
45	1248	-	-	-	-	-
46	1352	-	-	-	-	-
47	1138	1446	-	-	-	-

Table 185. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

OQ_LIN_10	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.78
29	16.55
30	16.67
31	16.61
32	16.21
33	16.16
34	16.16
35	16.23
36	16.29
37	16.44
38	30.41
39	30.77
40	31.15
41	30.94
42	30.41
43	30.60
44	30.59
45	30.40
46	31.32
47	31.43

Table 186. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_10			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	90.33%	*88.59%*	*91.76%*
29	88.07%	*86.38%*	*90.35%*
30	85.04%	*82.83%*	*86.30%*
31	83.84%	*81.27%*	*86.76%*
32	85.45%	*84.16%*	*87.20%*
33	87.58%	*85.66%*	*89.52%*
34	87.02%	*83.44%*	*90.37%*
35	86.69%	*83.73%*	*89.65%*
36	87.45%	*86.10%*	*89.71%*
37	87.88%	*83.36%*	*92.91%*
38	75.52%	*72.57%*	*77.89%*
39	73.76%	*72.21%*	*76.33%*
40	76.92%	*74.19%*	*79.08%*
41	76.05%	*75.21%*	*77.59%*
42	76.43%	*75.29%*	*77.83%*
43	74.73%	*70.53%*	*77.36%*
44	76.10%	*74.05%*	*80.34%*
45	75.63%	*70.60%*	*78.33%*
46	74.29%	*72.92%*	*75.44%*
47	77.19%	*75.67%*	*78.93%*

Table 187. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_10						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	460	619	903	1286	-	-
29	568	753	1127	1447	-	-
30	714	957	1423	-	-	-
31	763	1105	1328	-	-	-
32	560	861	1118	-	-	-
33	608	878	1233	-	-	-
34	561	826	1089	1329	-	-
35	700	949	1223	-	-	-
36	590	768	1159	-	-	-
37	625	867	1138	1144	-	-
38	1280	-	-	-	-	-
39	1347	-	-	-	-	-
40	1225	-	-	-	-	-
41	1395	-	-	-	-	-
42	1397	-	-	-	-	-
43	1323	-	-	-	-	-
44	1226	1399	-	-	-	-
45	1373	-	-	-	-	-
46	1441	-	-	-	-	-
47	1261	-	-	-	-	-

Table 188. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

TOP_10	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.44
29	15.98
30	16.01
31	16.05
32	16.03
33	15.97
34	16.10
35	16.03
36	16.00
37	16.00
38	30.08
39	30.39
40	31.16
41	30.61
42	30.37
43	30.01
44	30.06
45	29.81
46	30.05
47	29.97

Table 189. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_20			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	88.88%	*85.42%*	*91.94%*
29	87.36%	*83.82%*	*89.69%*
30	84.74%	*83.13%*	*85.97%*
31	85.42%	*84.00%*	*88.04%*
32	87.45%	*85.53%*	*88.59%*
33	86.15%	*84.41%*	*87.77%*
34	87.53%	*84.35%*	*89.82%*
35	86.45%	*83.03%*	*89.63%*
36	86.51%	*83.87%*	*89.99%*
37	86.89%	*82.56%*	*89.64%*
38	75.37%	*72.14%*	*78.73%*
39	74.49%	*72.28%*	*77.47%*
40	76.15%	*74.56%*	*78.29%*
41	75.10%	*73.32%*	*77.62%*
42	76.09%	*74.66%*	*78.99%*
43	77.49%	*75.36%*	*80.08%*
44	74.67%	*73.11%*	*76.20%*
45	73.45%	*69.83%*	*75.51%*
46	74.22%	*70.05%*	*78.56%*
47	77.42%	*75.49%*	*79.04%*

Table 190. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_20						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	468	695	1013	1158	-	-
29	681	934	1221	-	-	-
30	740	1136	1395	-	-	-
31	685	973	1302	-	-	-
32	611	955	1306	-	-	-
33	621	881	1308	-	-	-
34	618	798	1070	-	-	-
35	636	920	1138	-	-	-
36	630	980	1235	-	-	-
37	631	866	1186	-	-	-
38	1309	-	-	-	-	-
39	1316	-	-	-	-	-
40	1404	-	-	-	-	-
41	1434	-	-	-	-	-
42	1277	-	-	-	-	-
43	1275	1488	-	-	-	-
44	1441	-	-	-	-	-
45	1455	-	-	-	-	-
46	1304	-	-	-	-	-
47	1212	-	-	-	-	-

Table 191. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

TOP_20	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.67
29	16.27
30	16.12
31	16.14
32	16.16
33	16.67
34	16.50
35	16.40
36	15.96
37	16.11
38	29.97
39	30.09
40	30.19
41	30.60
42	30.58
43	30.06
44	30.19
45	31.09
46	30.61
47	30.16

Table 192. Reached percentages of the optimimum of the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_30			
	fitness value		
	population 100		
case #	**1500 generations**		
	avg	*min*	*max*
28	89.98%	*89.02%*	*91.05%*
29	86.70%	*82.22%*	*89.91%*
30	85.92%	*83.64%*	*89.62%*
31	84.51%	*80.97%*	*86.25%*
32	87.40%	*85.02%*	*89.69%*
33	87.14%	*85.69%*	*88.75%*
34	86.66%	*84.59%*	*88.78%*
35	88.21%	*85.43%*	*91.47%*
36	86.08%	*82.63%*	*90.69%*
37	85.93%	*84.33%*	*87.41%*
38	74.33%	*70.57%*	*78.66%*
39	72.28%	*70.29%*	*74.65%*
40	76.34%	*74.79%*	*80.18%*
41	74.54%	*72.88%*	*76.84%*
42	74.88%	*73.87%*	*76.34%*
43	75.78%	*72.65%*	*80.84%*
44	74.62%	*70.86%*	*76.54%*
45	77.04%	*75.63%*	*79.44%*
46	74.98%	*71.65%*	*80.74%*
47	77.29%	*75.01%*	*79.79%*

Table 193. Number of generations needed to reach 75%, 80%, 85%, 90%, 95%, 100% by the optimizations of synthetic datasets for Cases 28-47 in our experiments.

TOP_30						
	population 100					
case #	**1500 generations**					
	75%	80%	85%	90%	95%	100%
28	486	619	951	1426	-	-
29	637	864	1189	-	-	-
30	623	829	1105	-	-	-
31	746	1061	1401	-	-	-
32	670	929	1281	-	-	-
33	660	881	1245	-	-	-
34	582	912	1326	-	-	-
35	629	813	1185	1339	-	-
36	606	892	1150	1362	-	-
37	695	996	1408	-	-	-
38	1377	-	-	-	-	-
39	-	-	-	-	-	-
40	1358	1400	-	-	-	-
41	1317	-	-	-	-	-
42	1329	-	-	-	-	-
43	1317	1305	-	-	-	-
44	1440	-	-	-	-	-
45	1291	-	-	-	-	-
46	1107	1399	-	-	-	-
47	1274	-	-	-	-	-

Table 194. Average time of the optimizations of synthetic datasets for Cases 28-47 in our experiments. The average time is displayed as seconds.

TOP_30	
	pop. 100
case #	**1500 gen.**
	avg. time
28	16.01
29	16.17
30	16.08
31	16.10
32	16.20
33	16.10
34	16.11
35	16.71
36	16.49
37	16.20
38	30.35
39	30.18
40	30.59
41	30.17
42	30.15
43	30.21
44	30.26
45	30.27
46	31.05
47	30.82

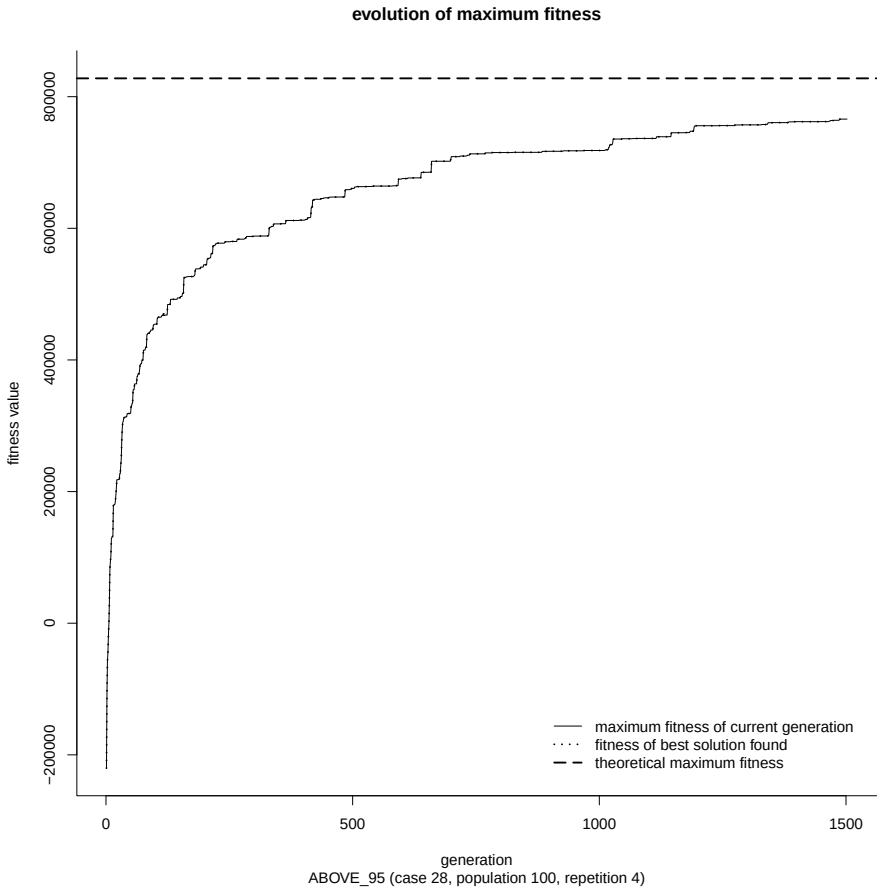

Fig. 107. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

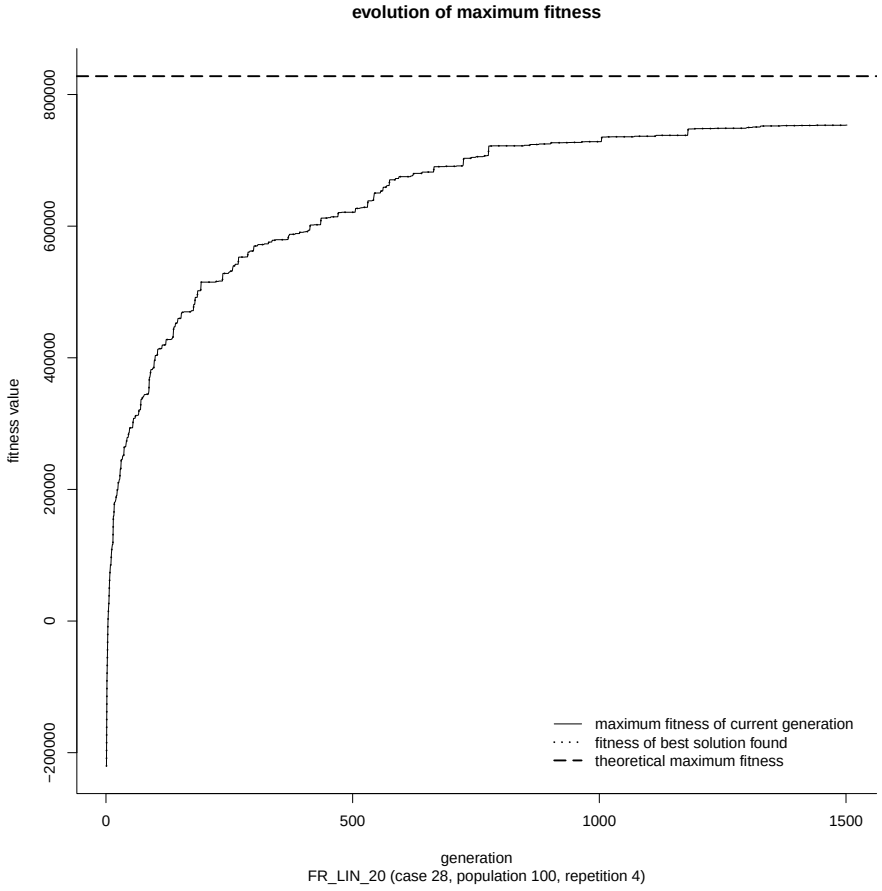

Fig. 108. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

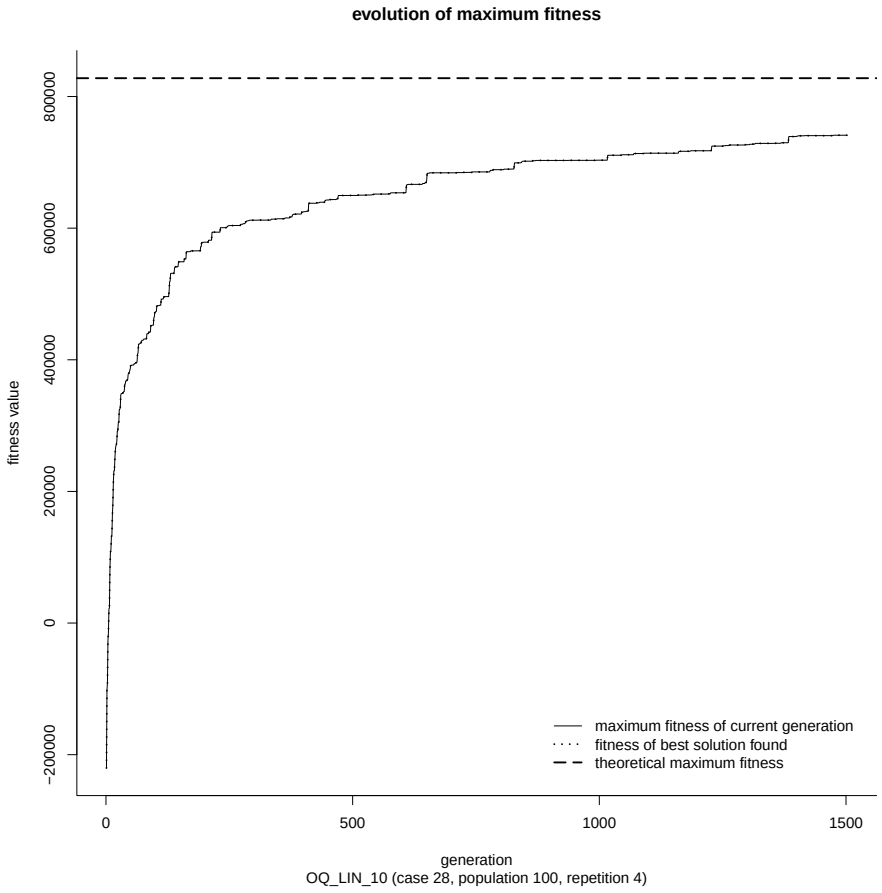

Fig. 109. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

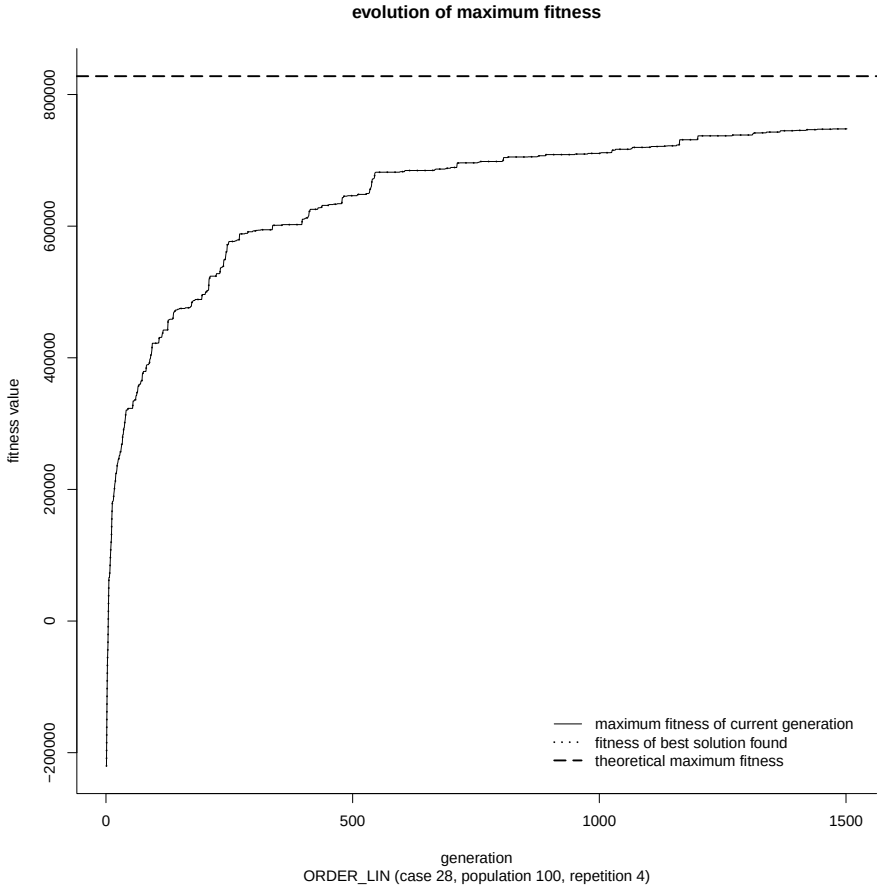

Fig. 110. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

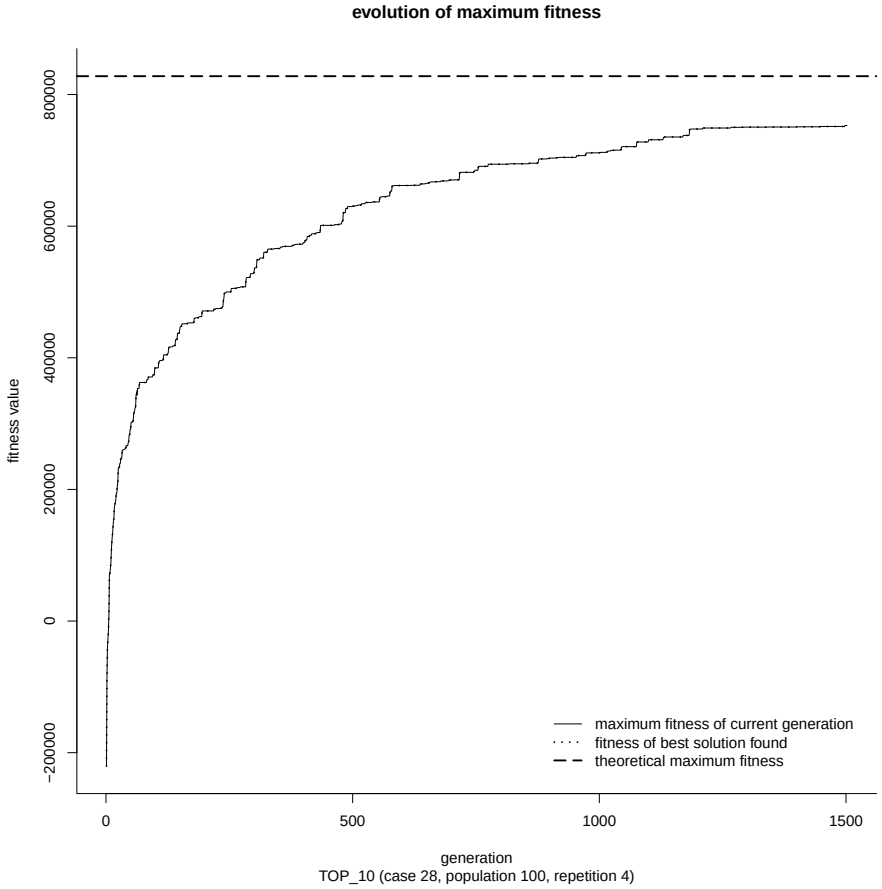

Fig. 111. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

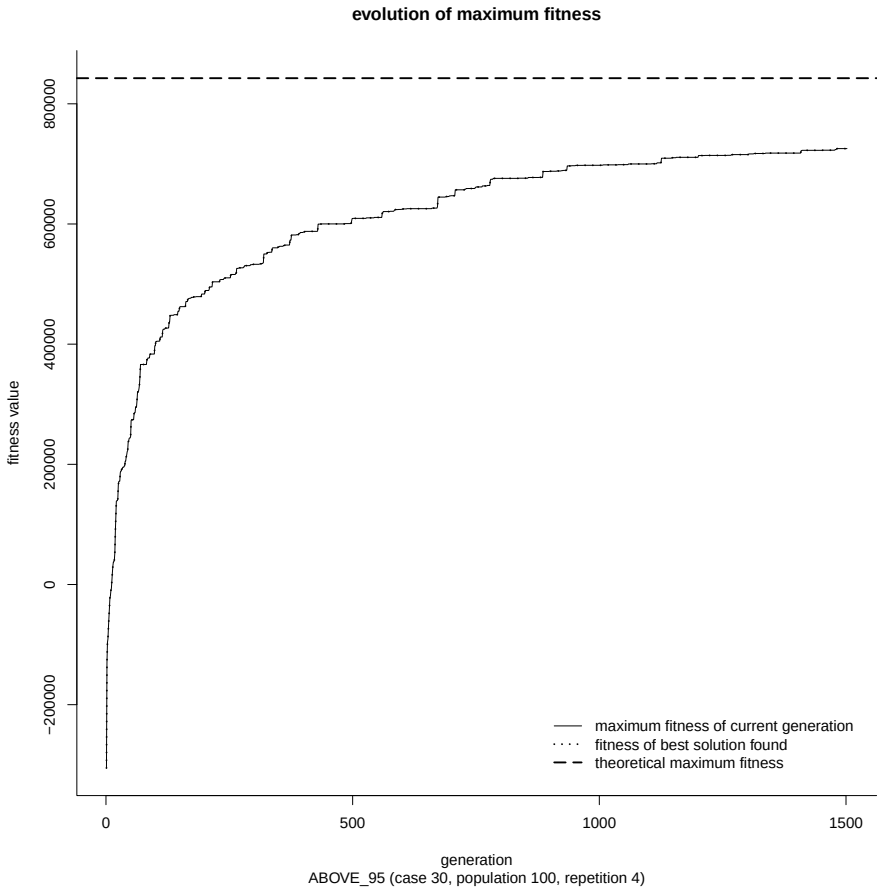

Fig. 112. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

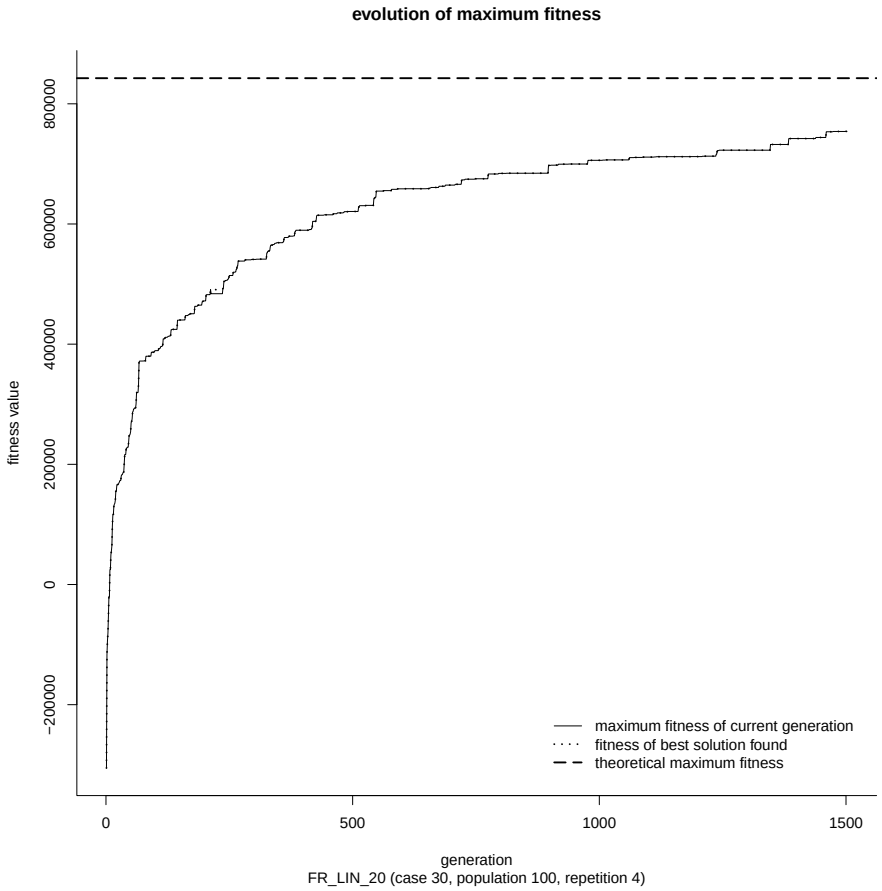

Fig. 113. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

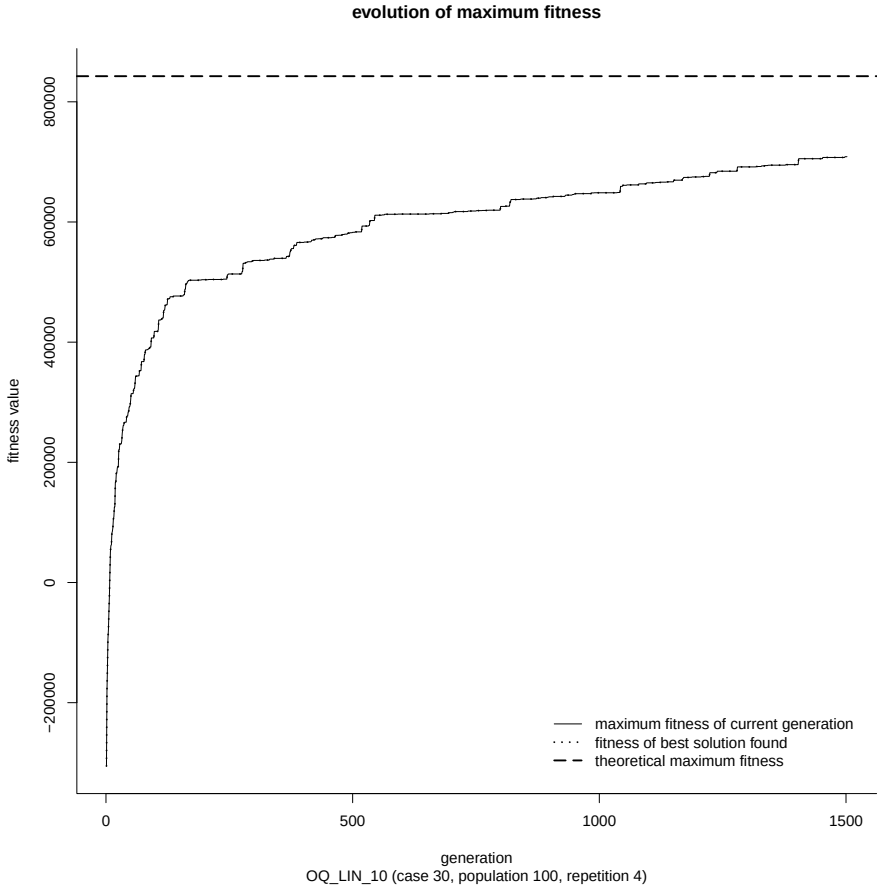

Fig. 114. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

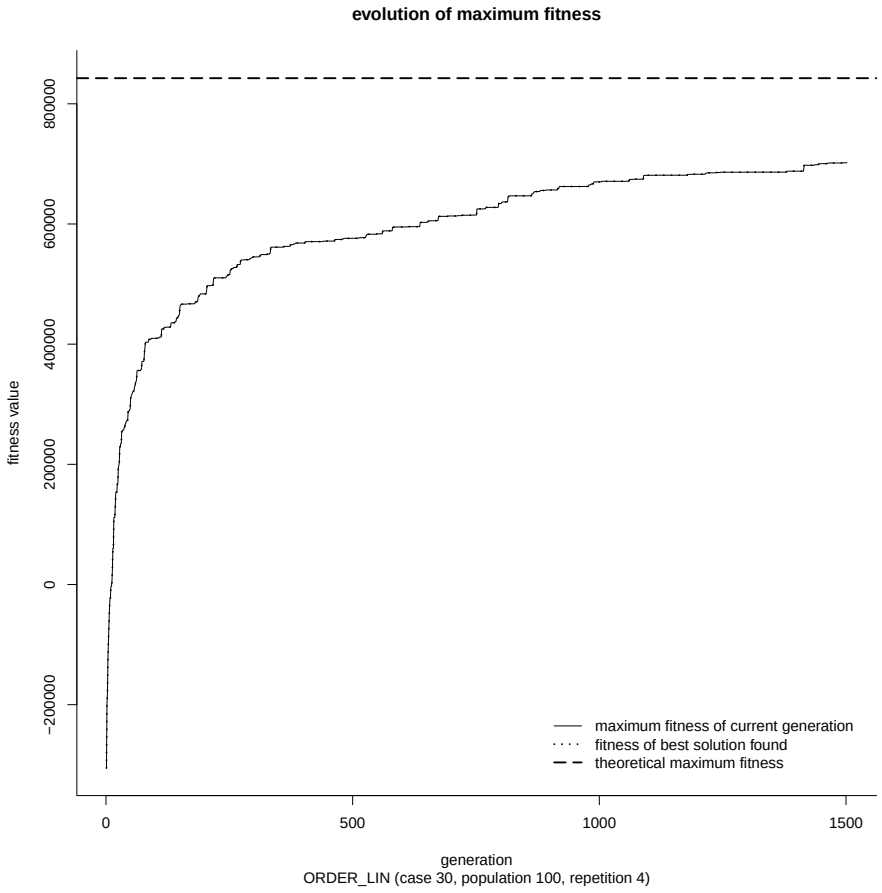

Fig. 115. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

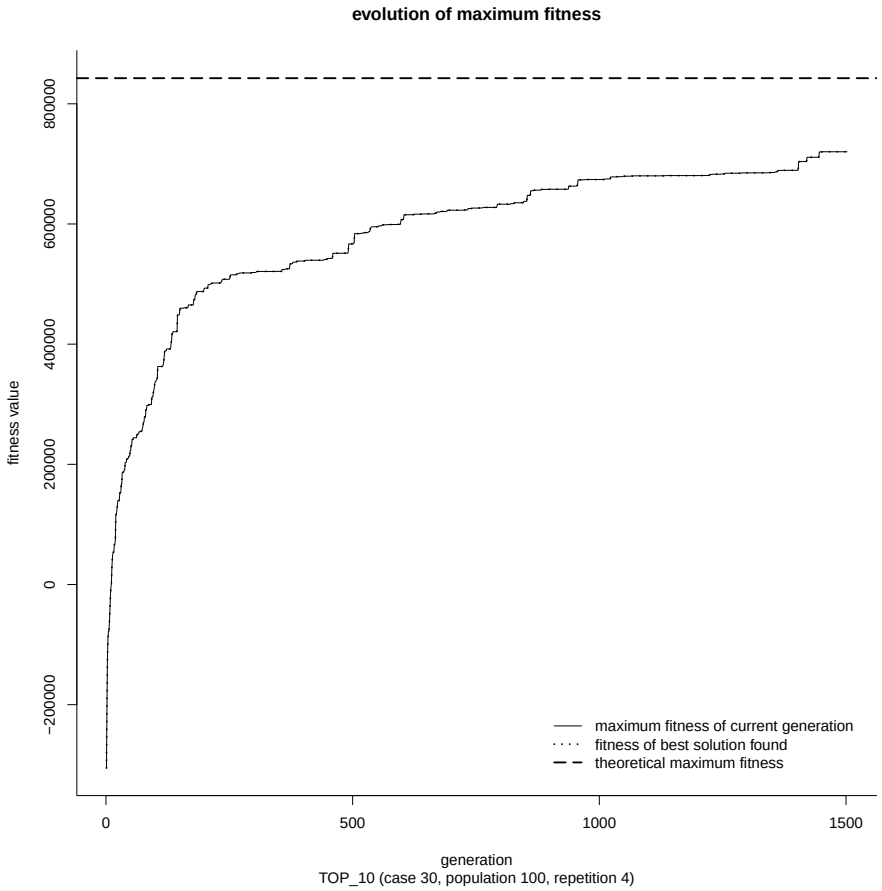

Fig. 116. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

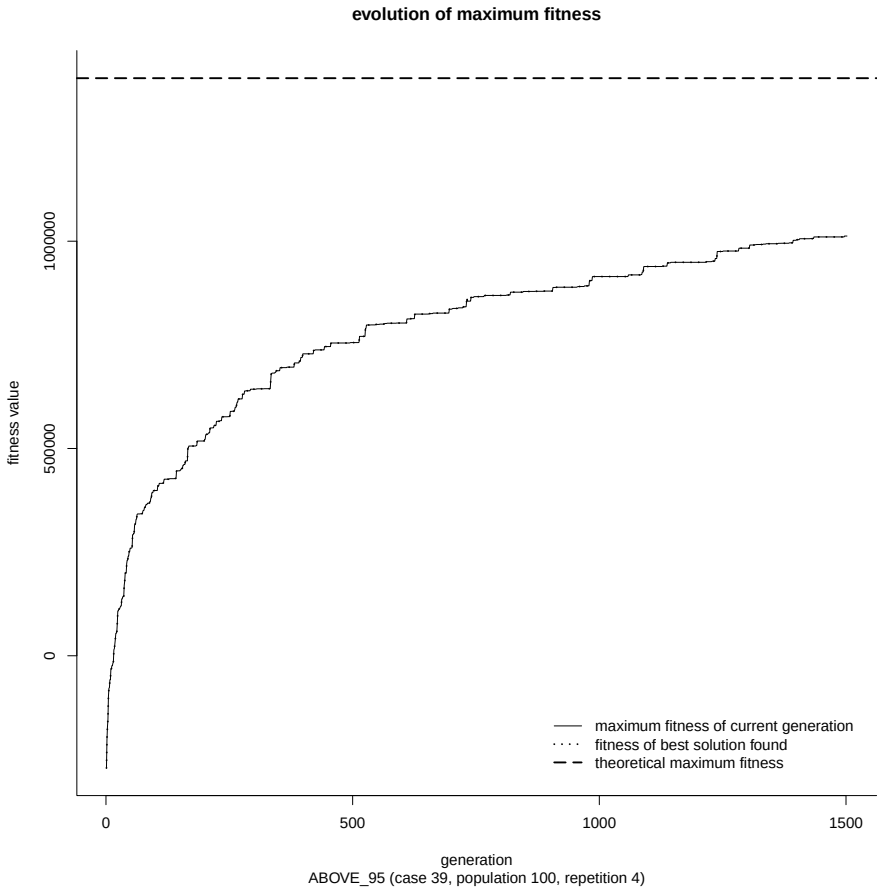

Fig. 117. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

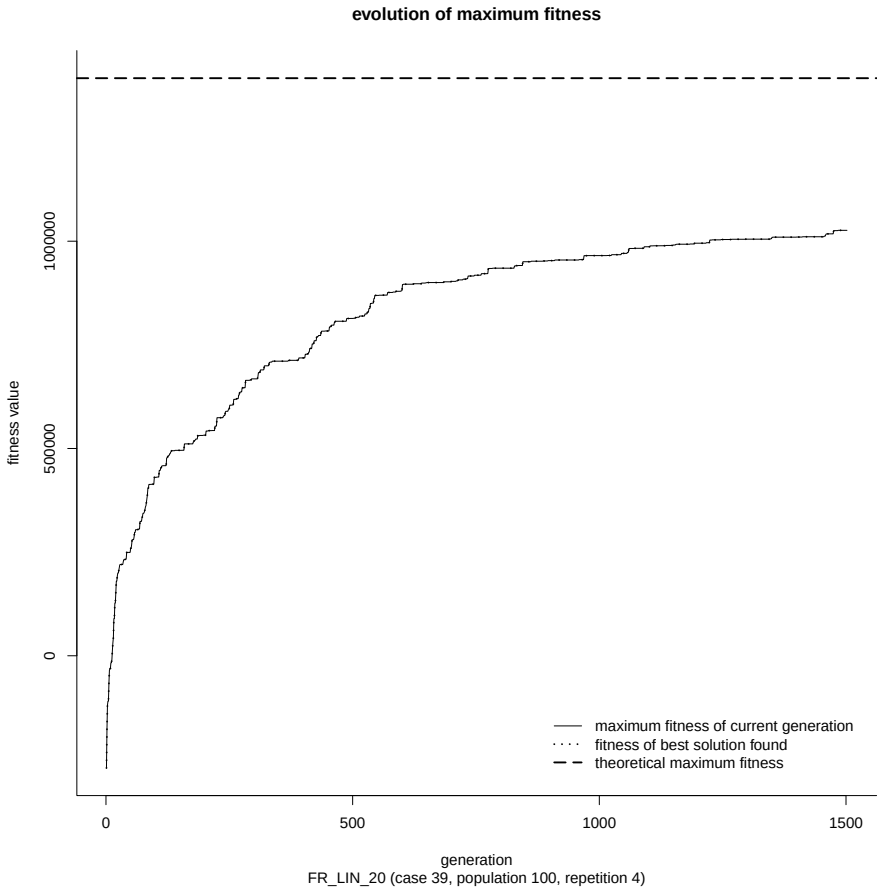

Fig. 118. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

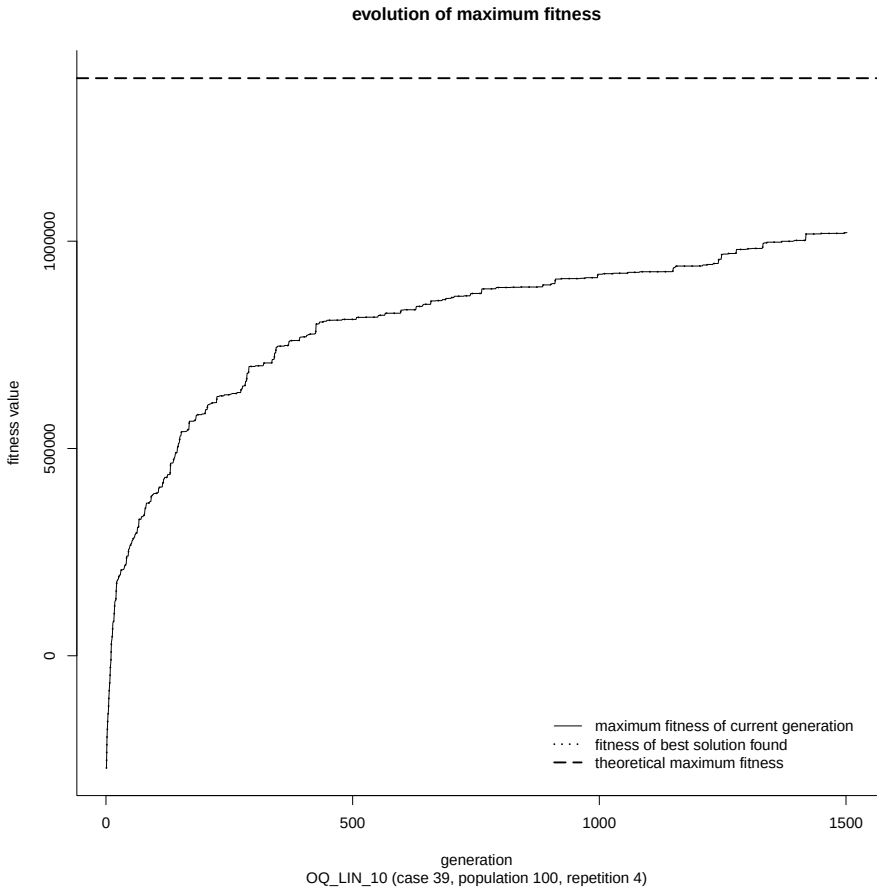

Fig. 119. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

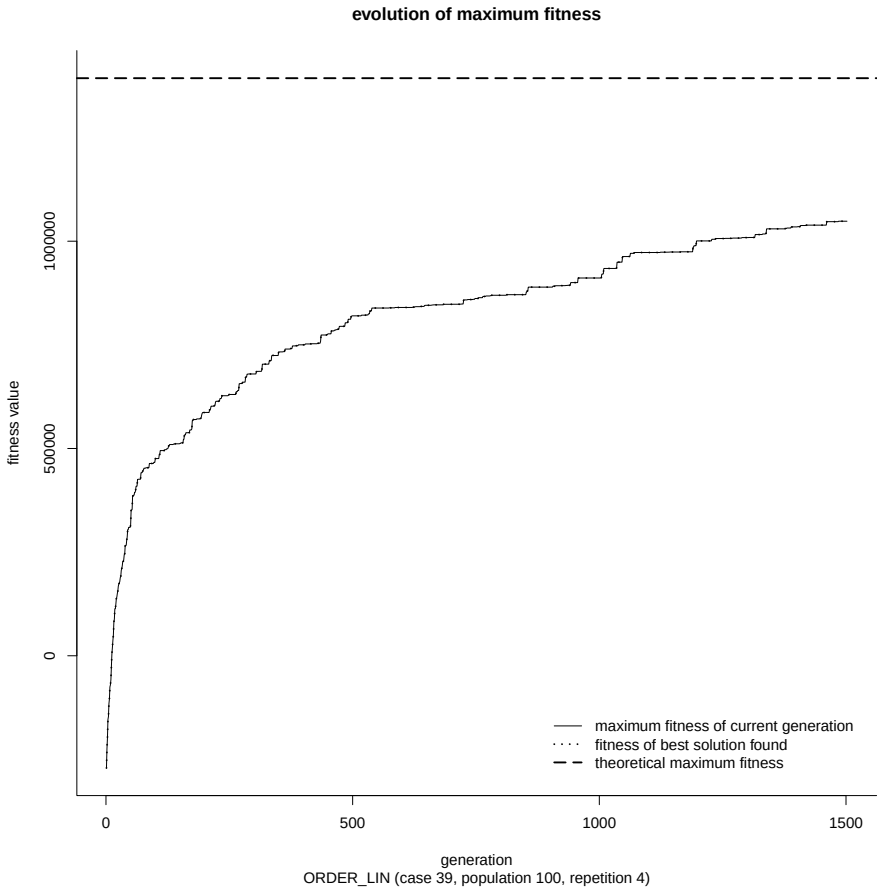

Fig. 120. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.

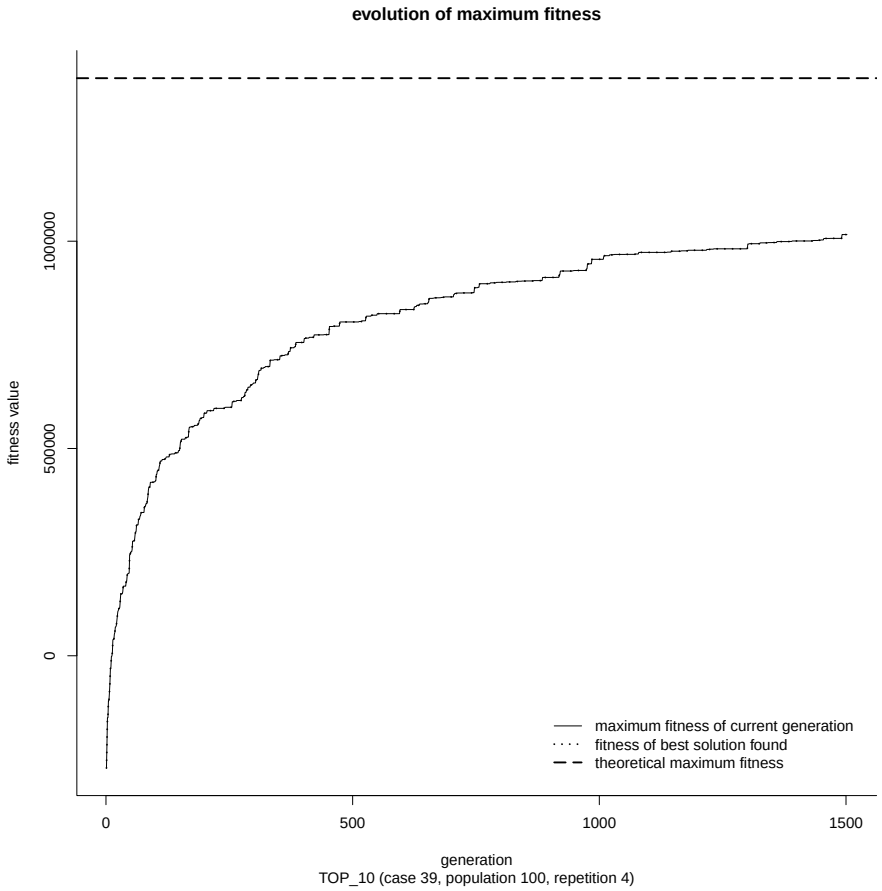

Fig. 121. Evolution of the fitness of the current generation, of the fitness of the best solution found and of the theoretical maximum fitness of an optimization in our experiments.