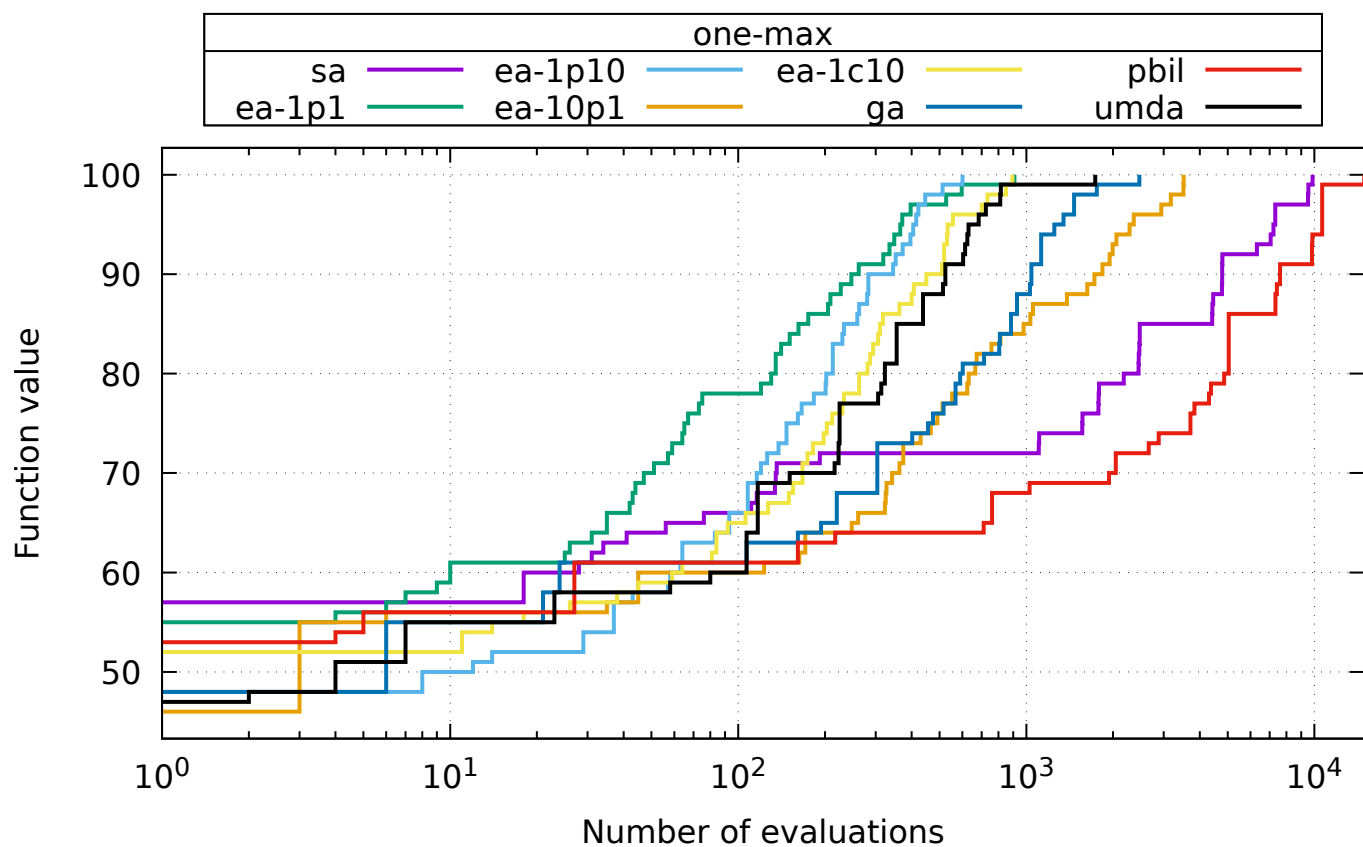# HNCO
Evolution of maximum
of various black box optimization algorithms

August 7, 2020
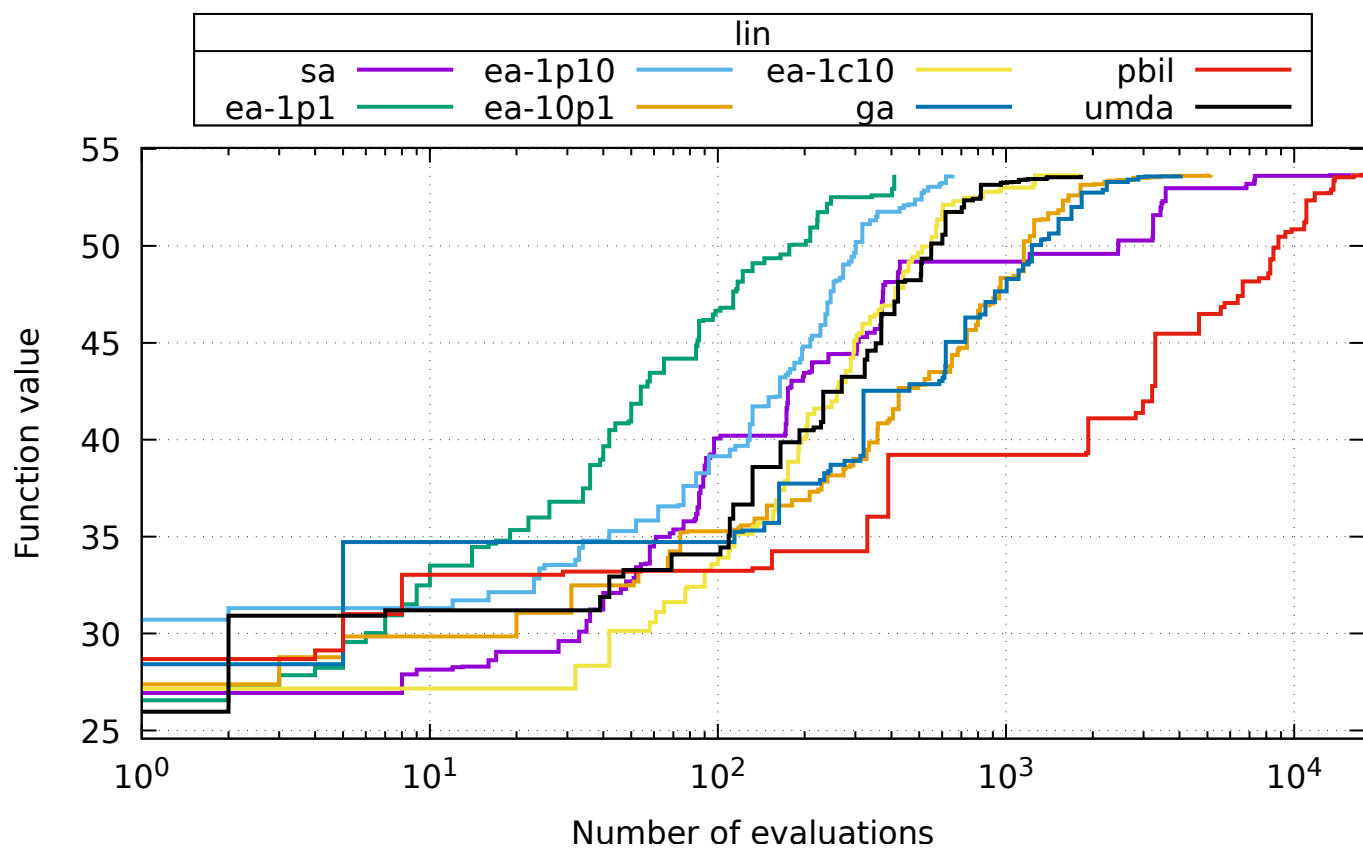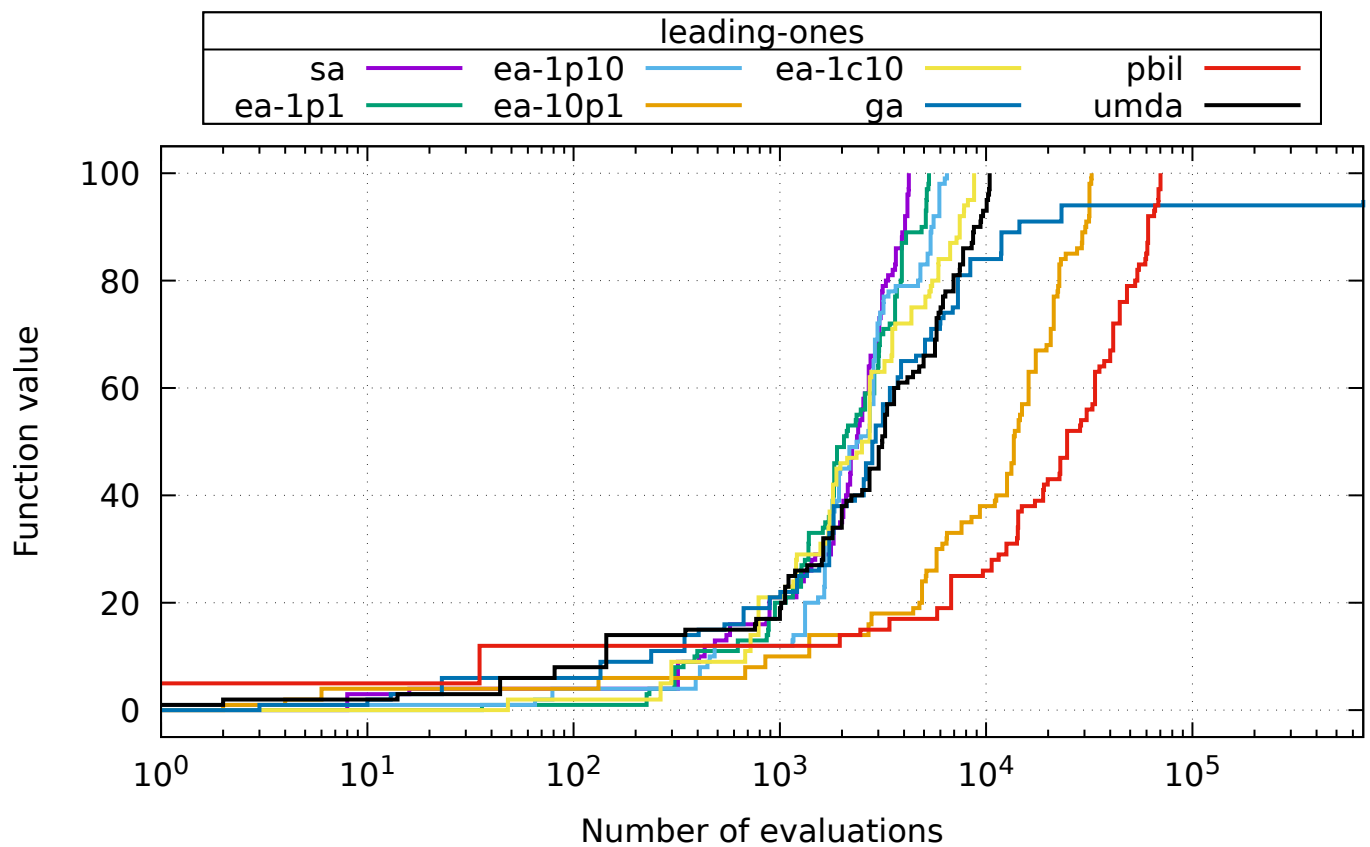
Contents

1   one-max

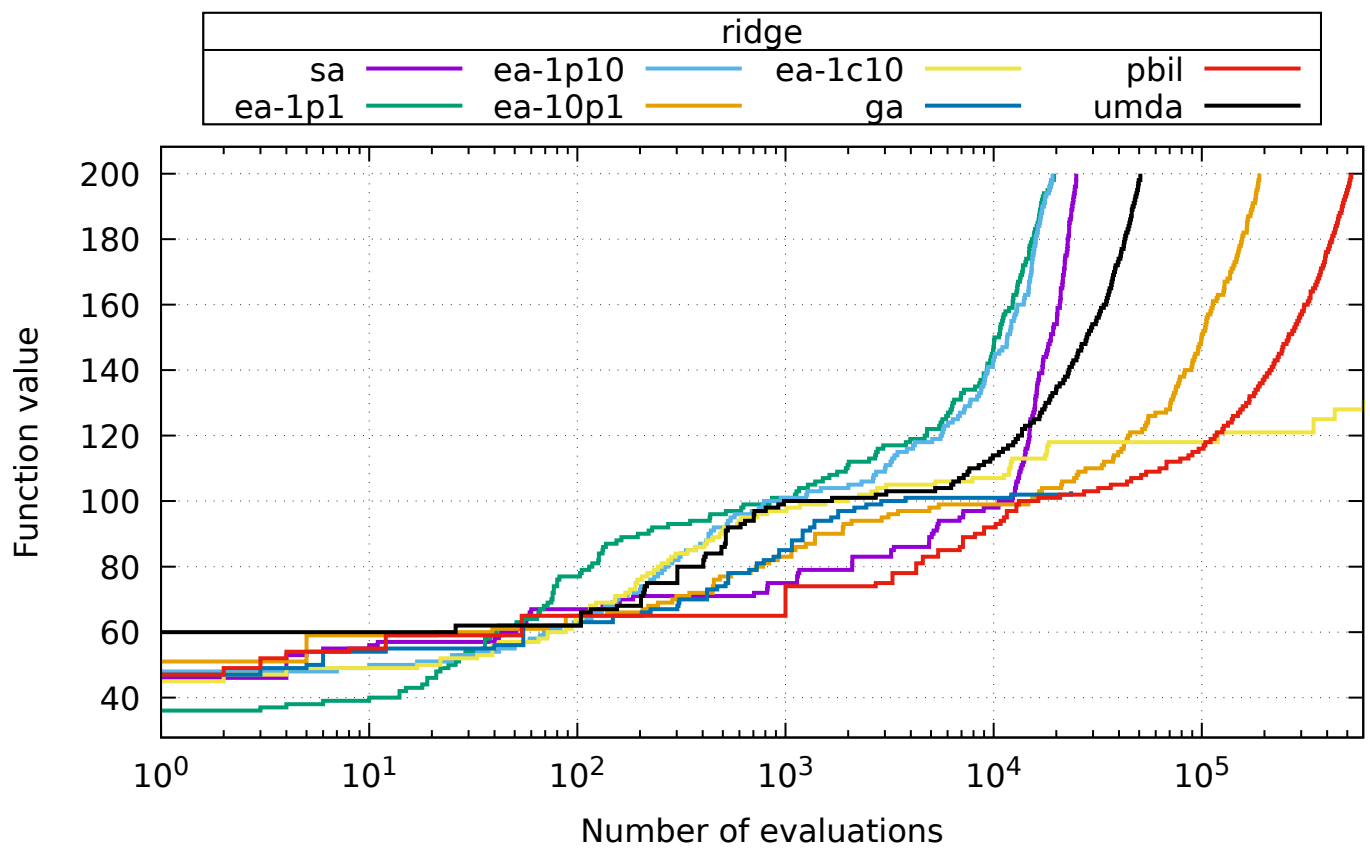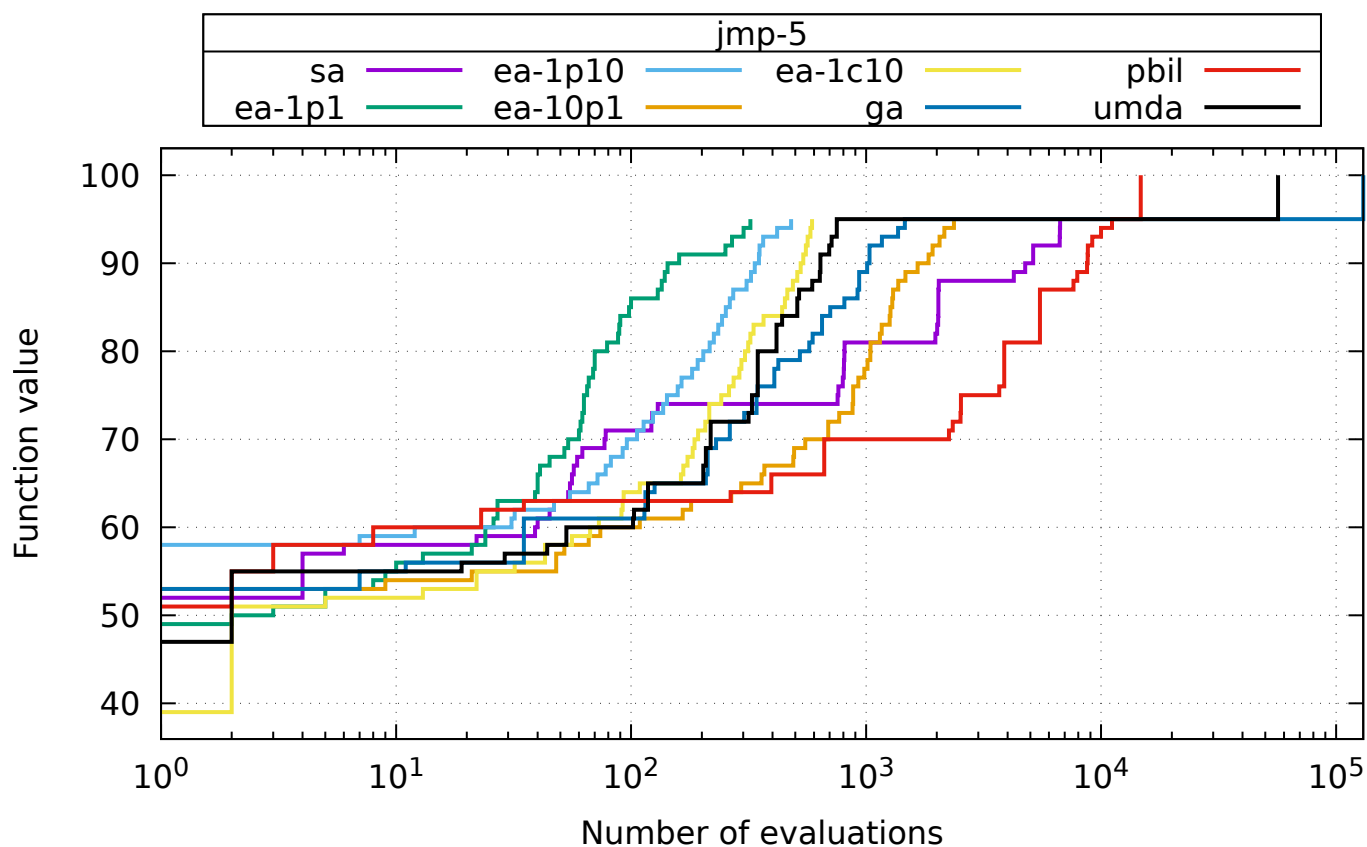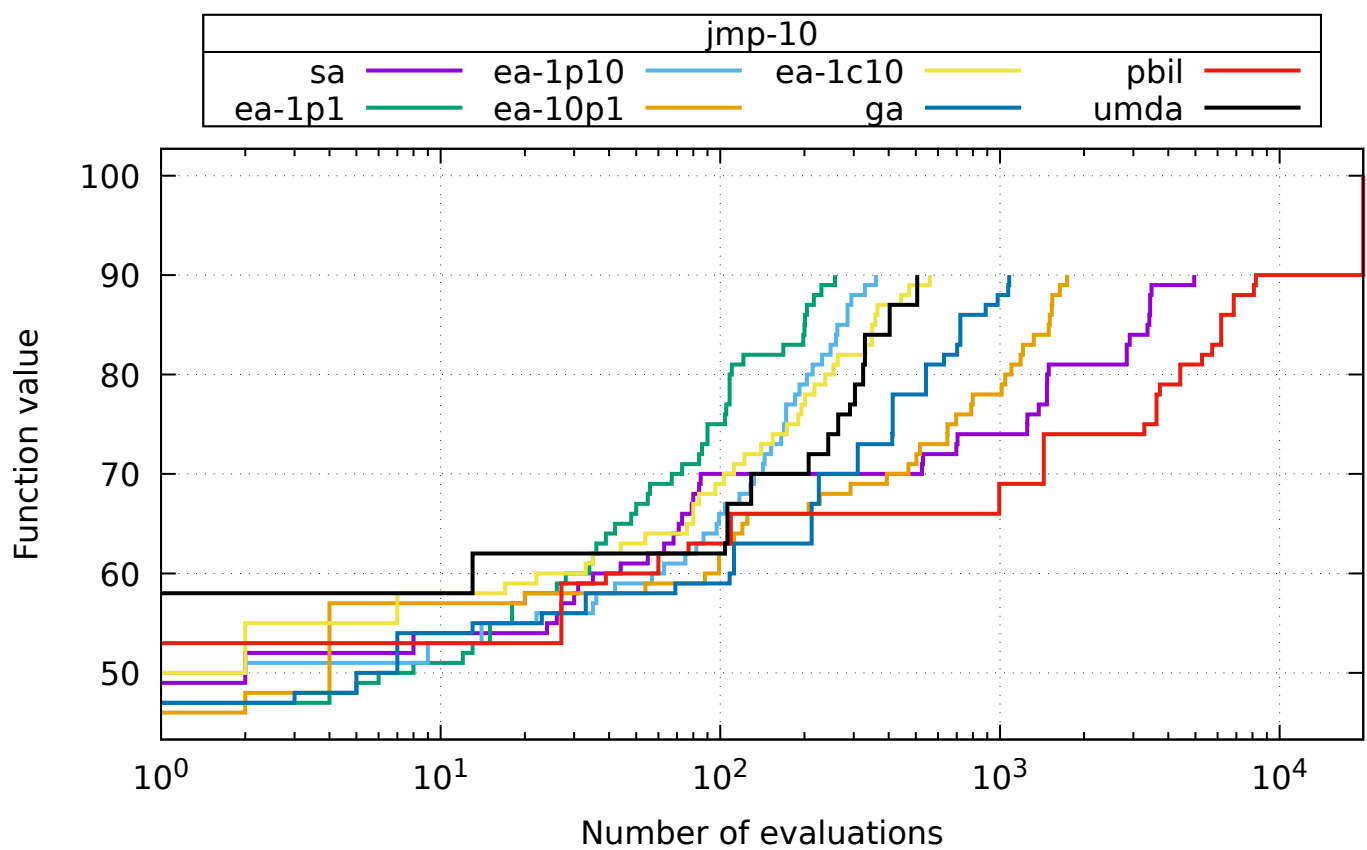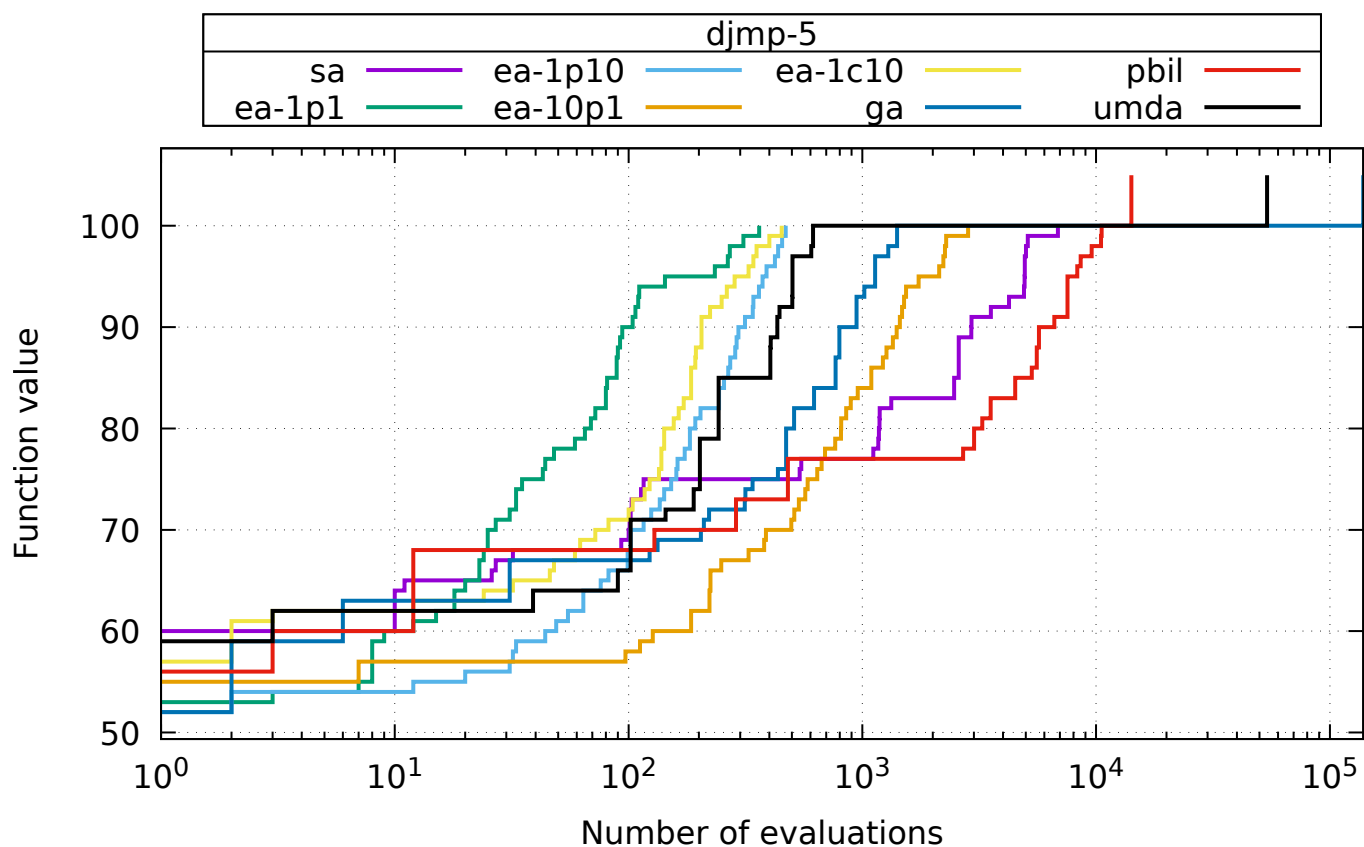

2   lin

3   leading-ones

4   ridge

5 jmp-5

6 jmp-10

7 djmp-5

8 djmp-10
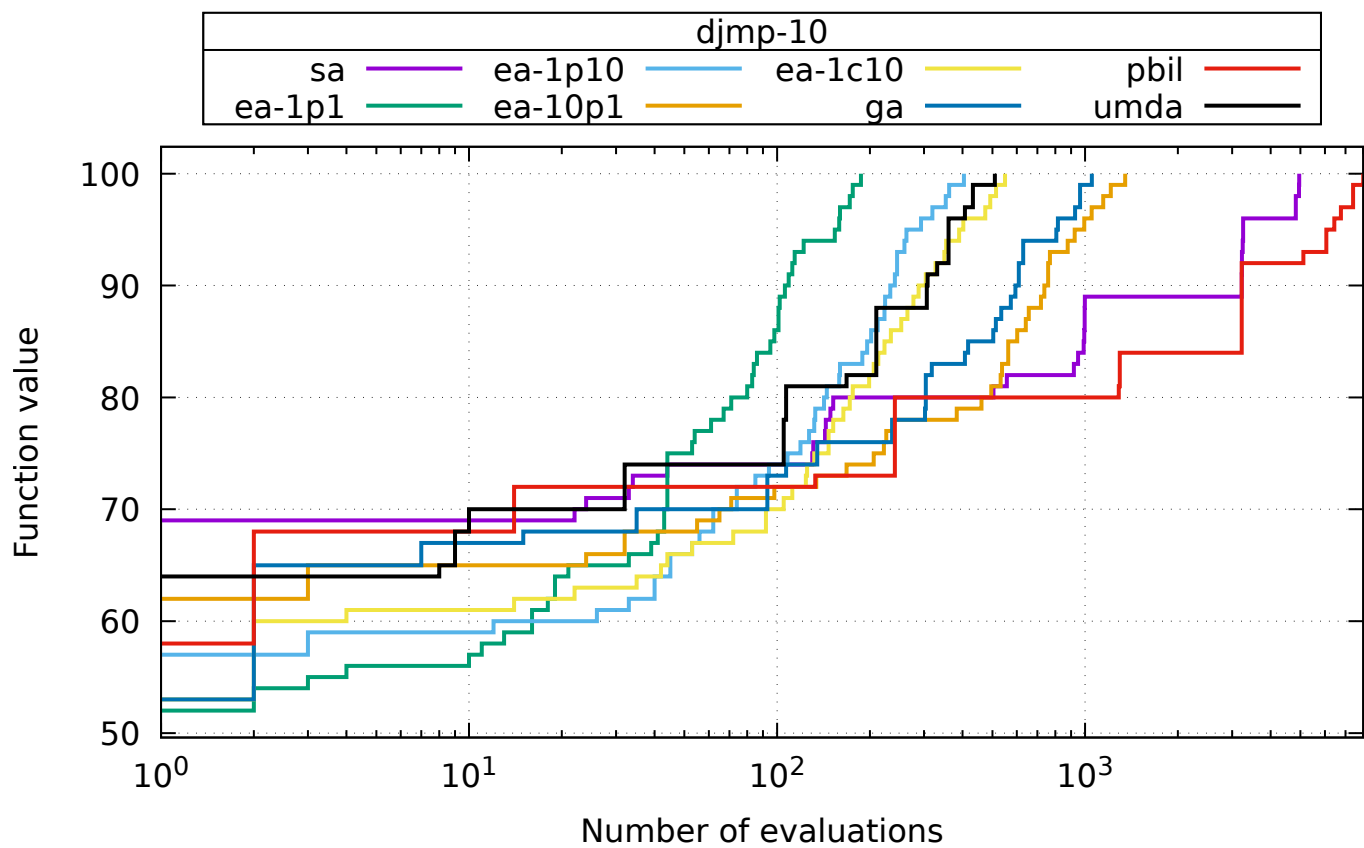
9   fp-5
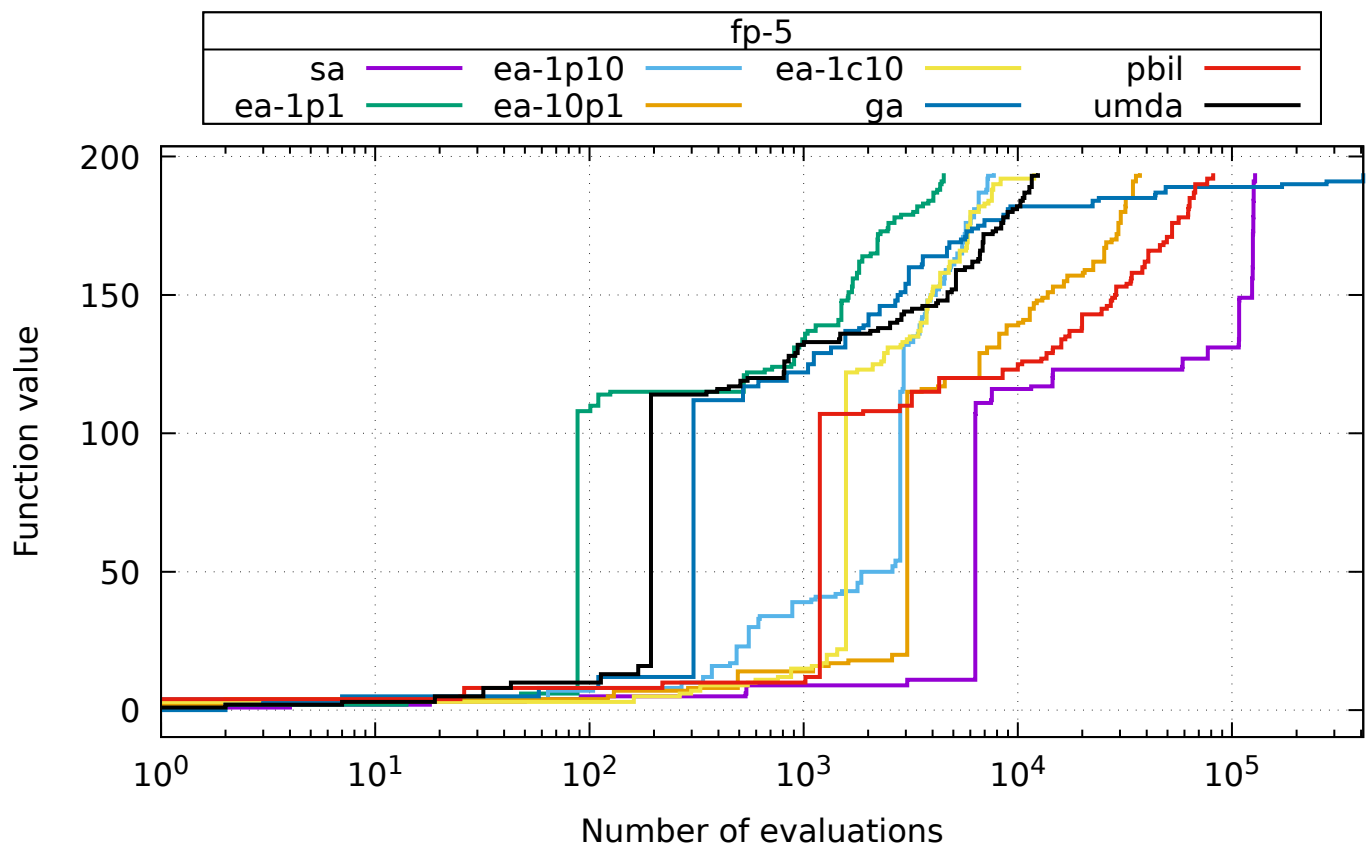
10   fp-10
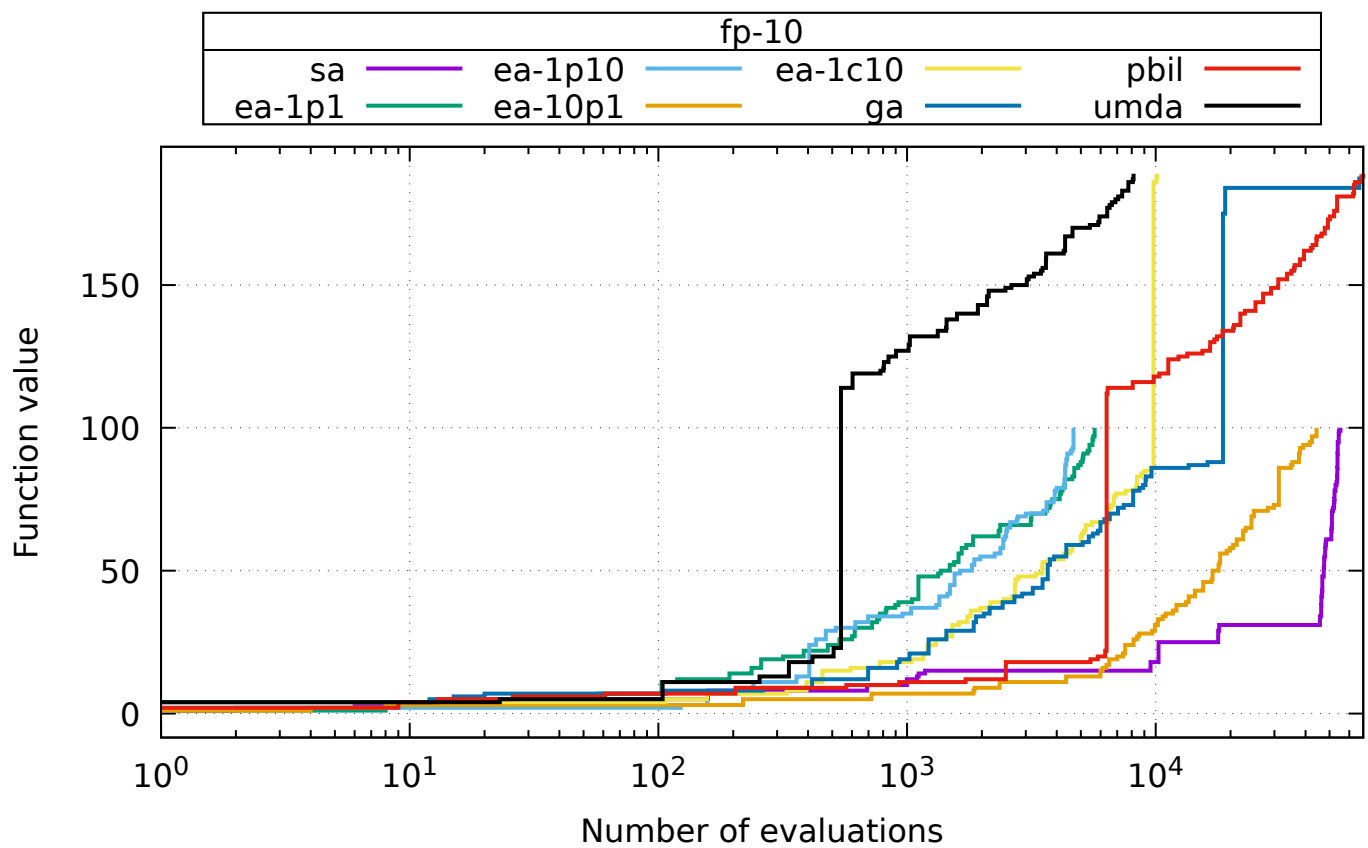
11 nk
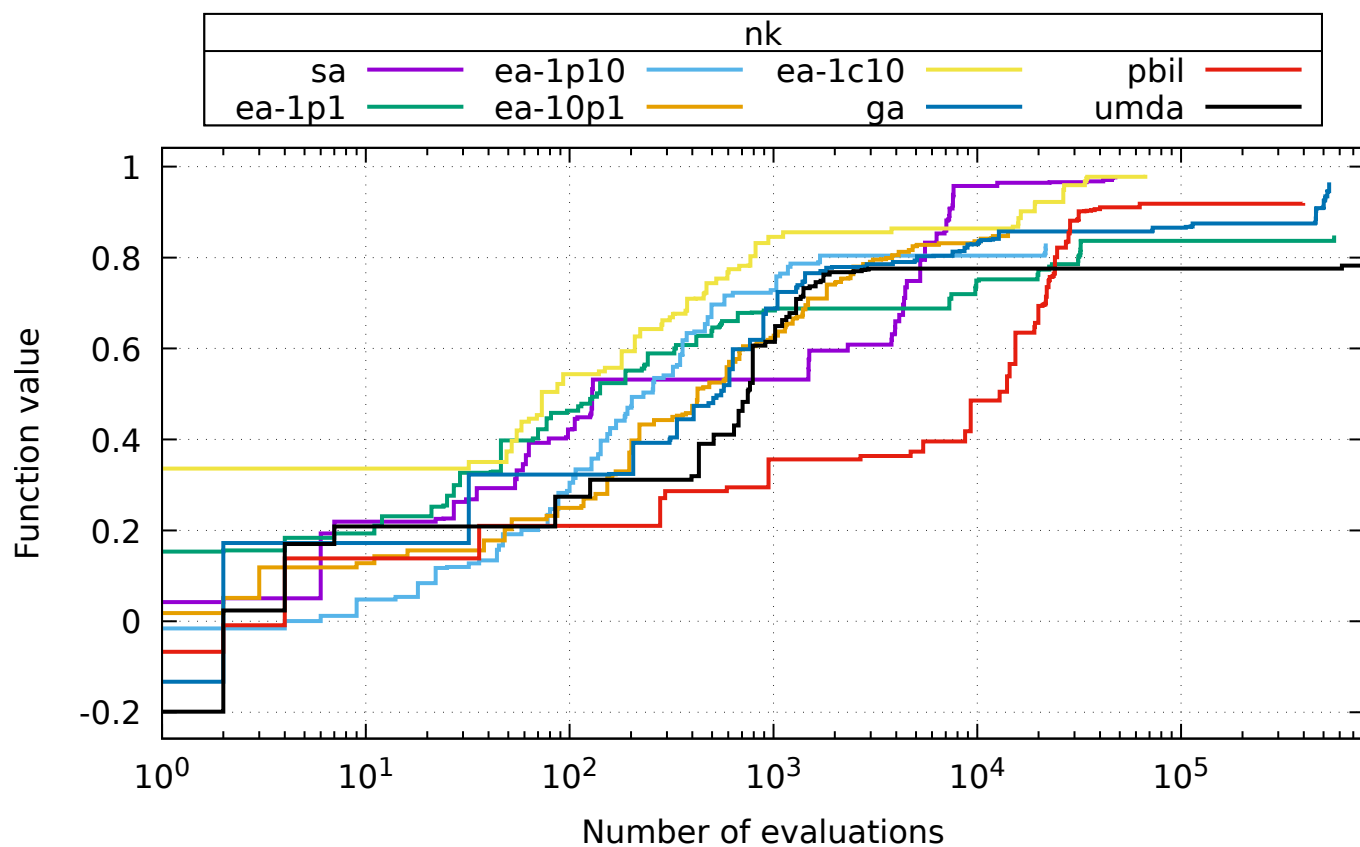
12 max-sat
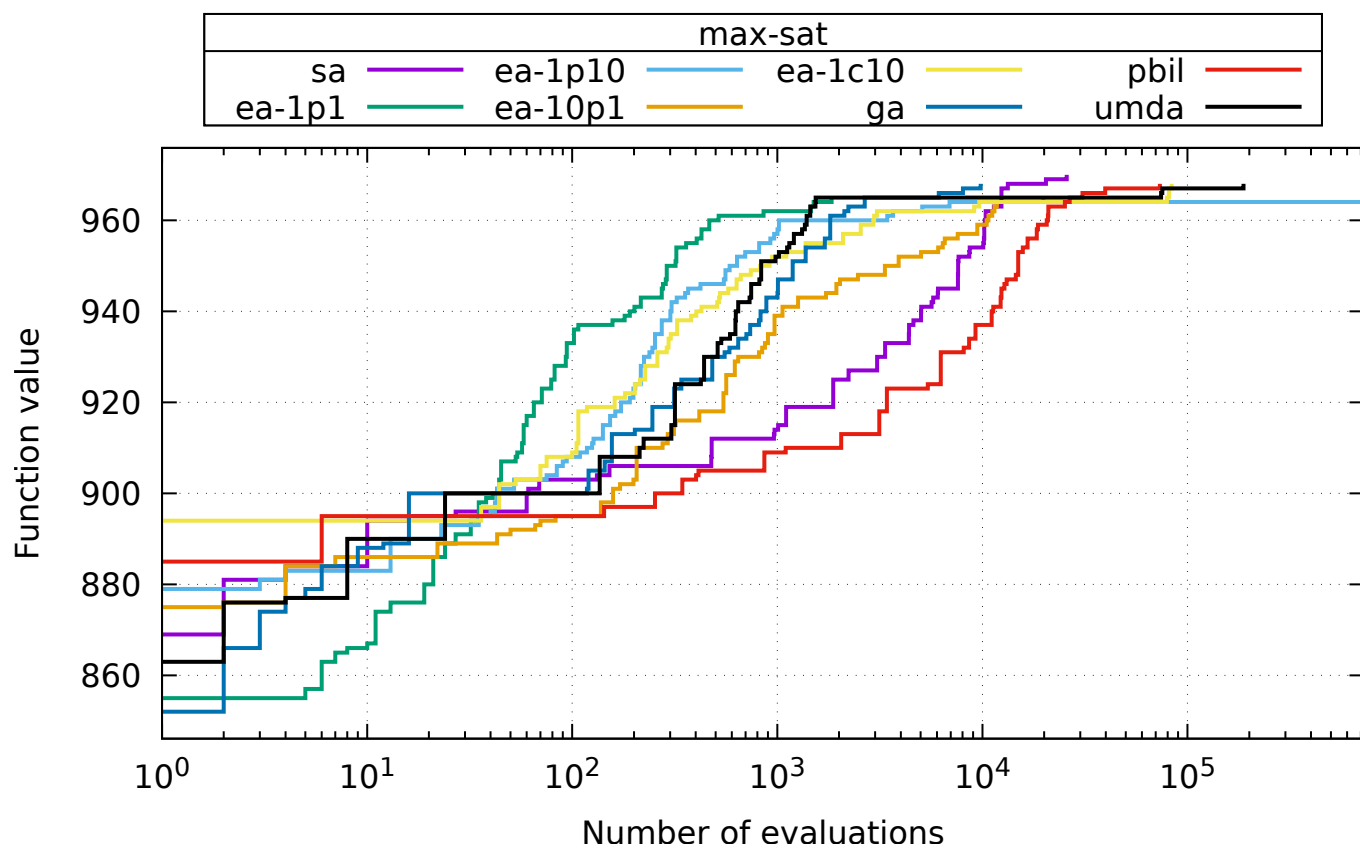
13 labs
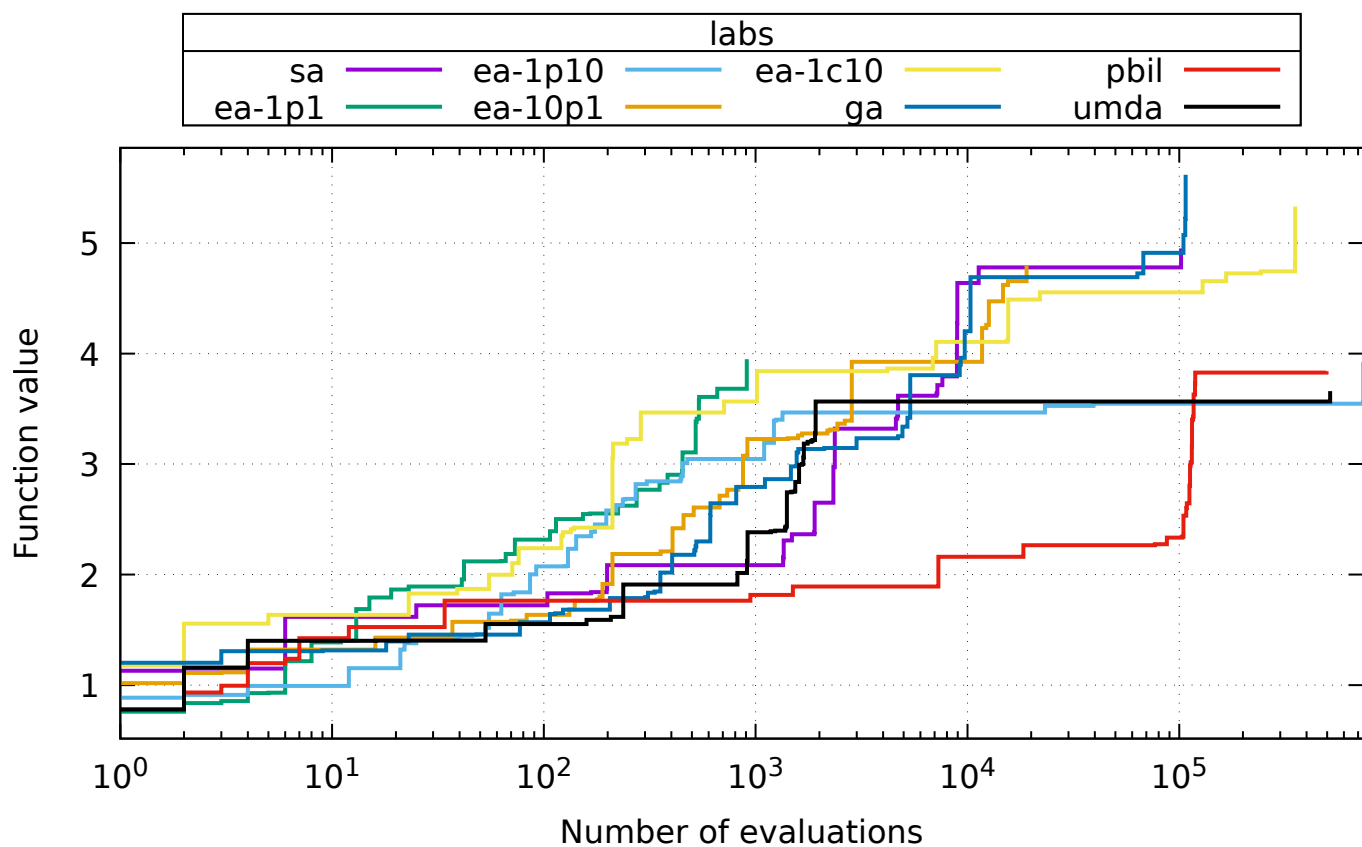
14 ep
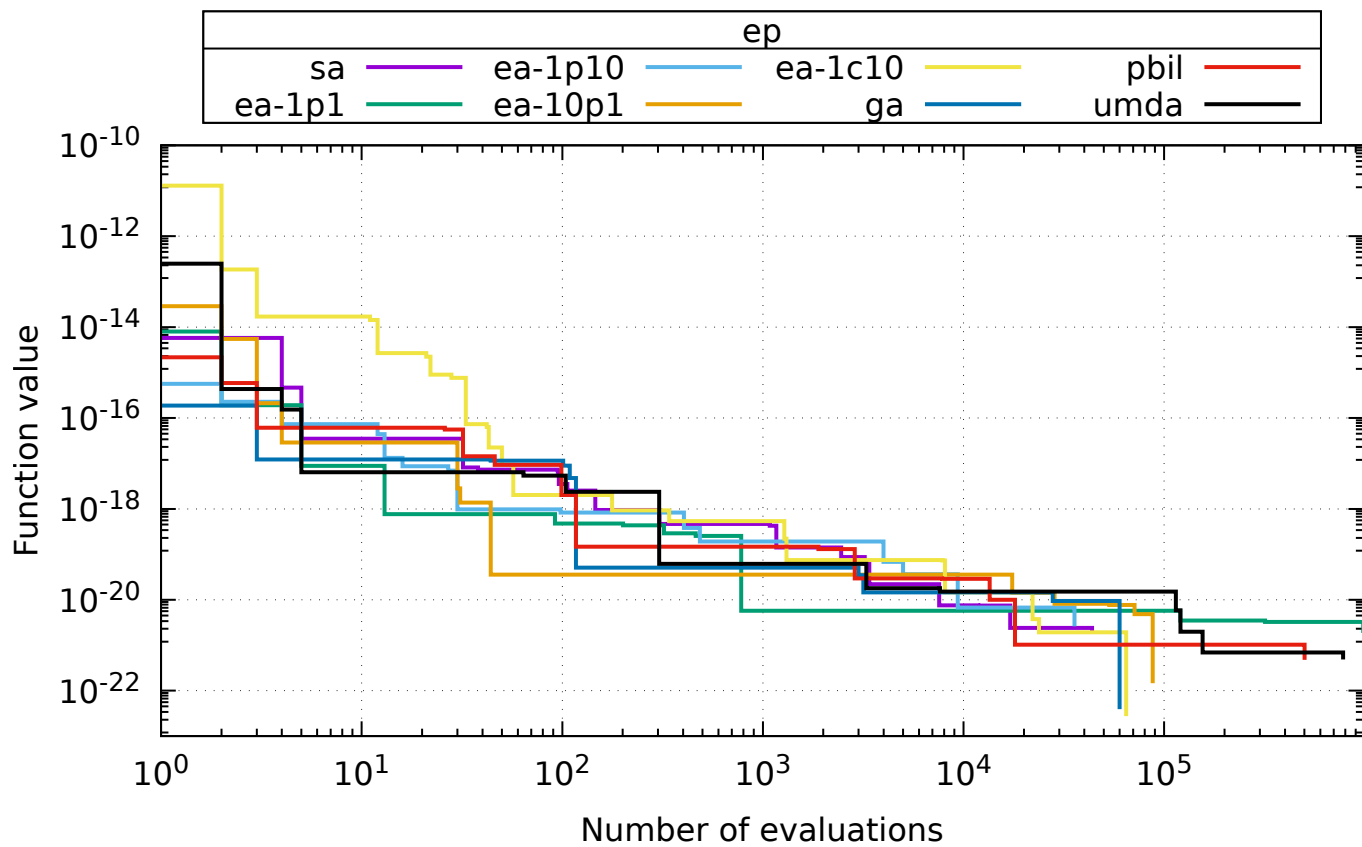
15 cancel
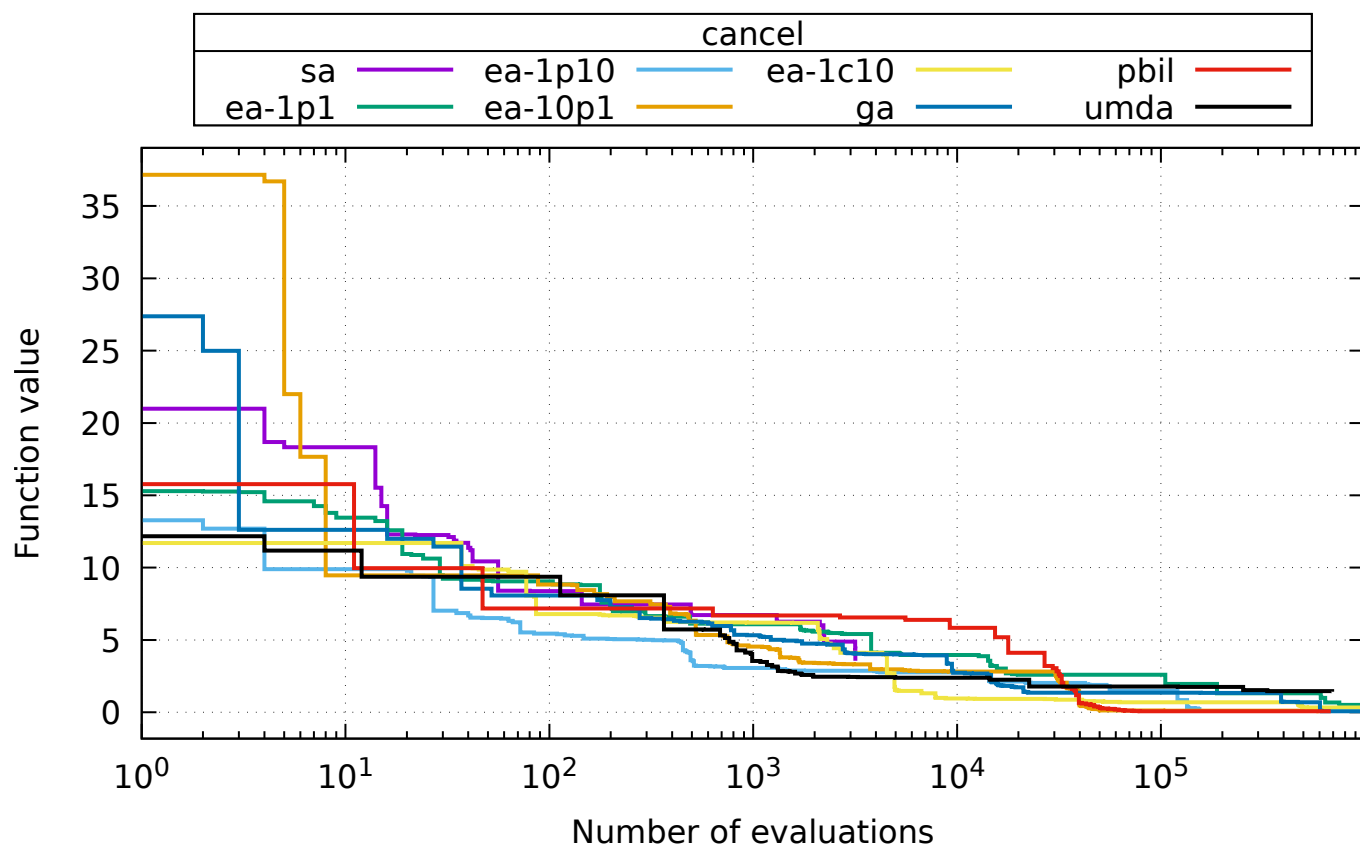
16 trap
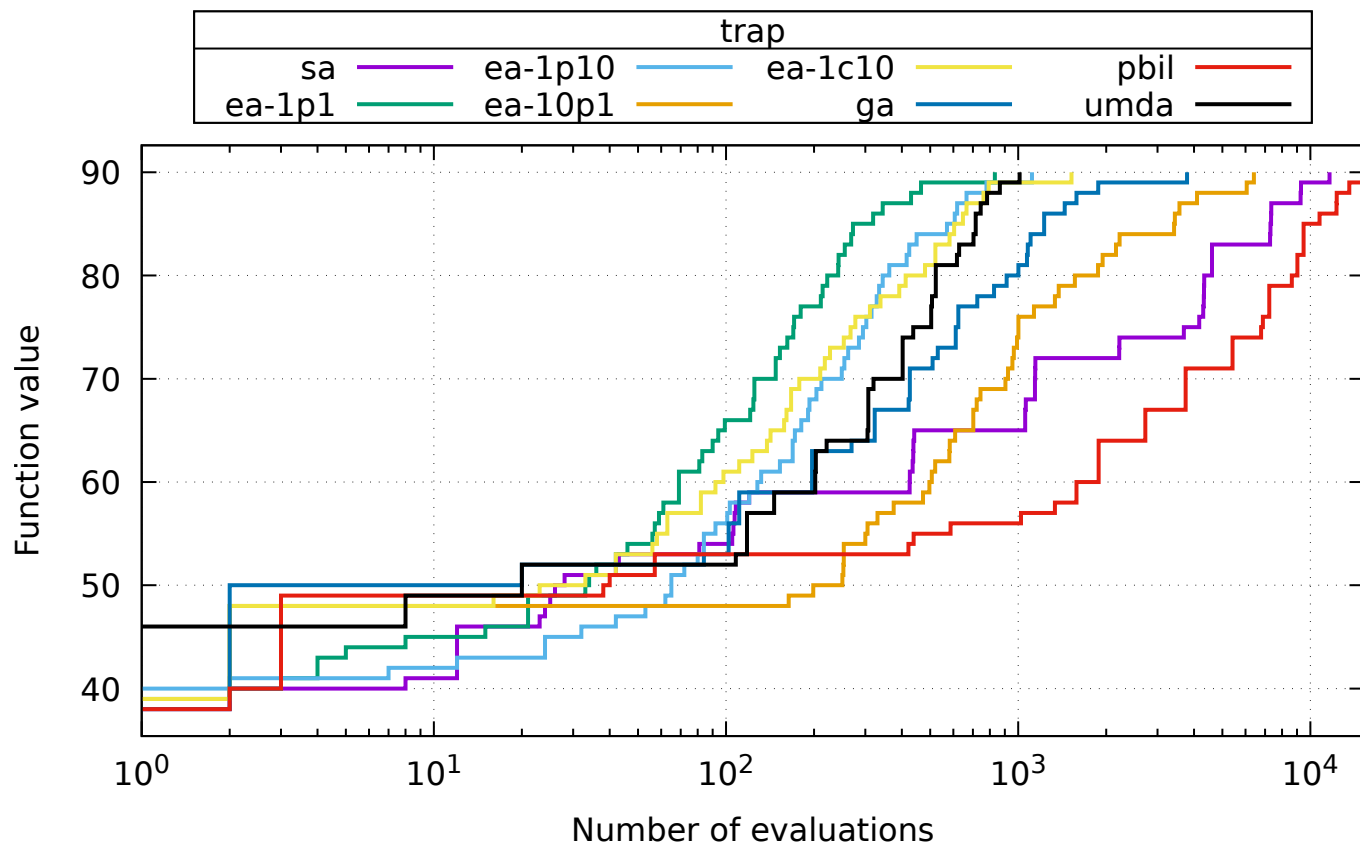
17 hiff
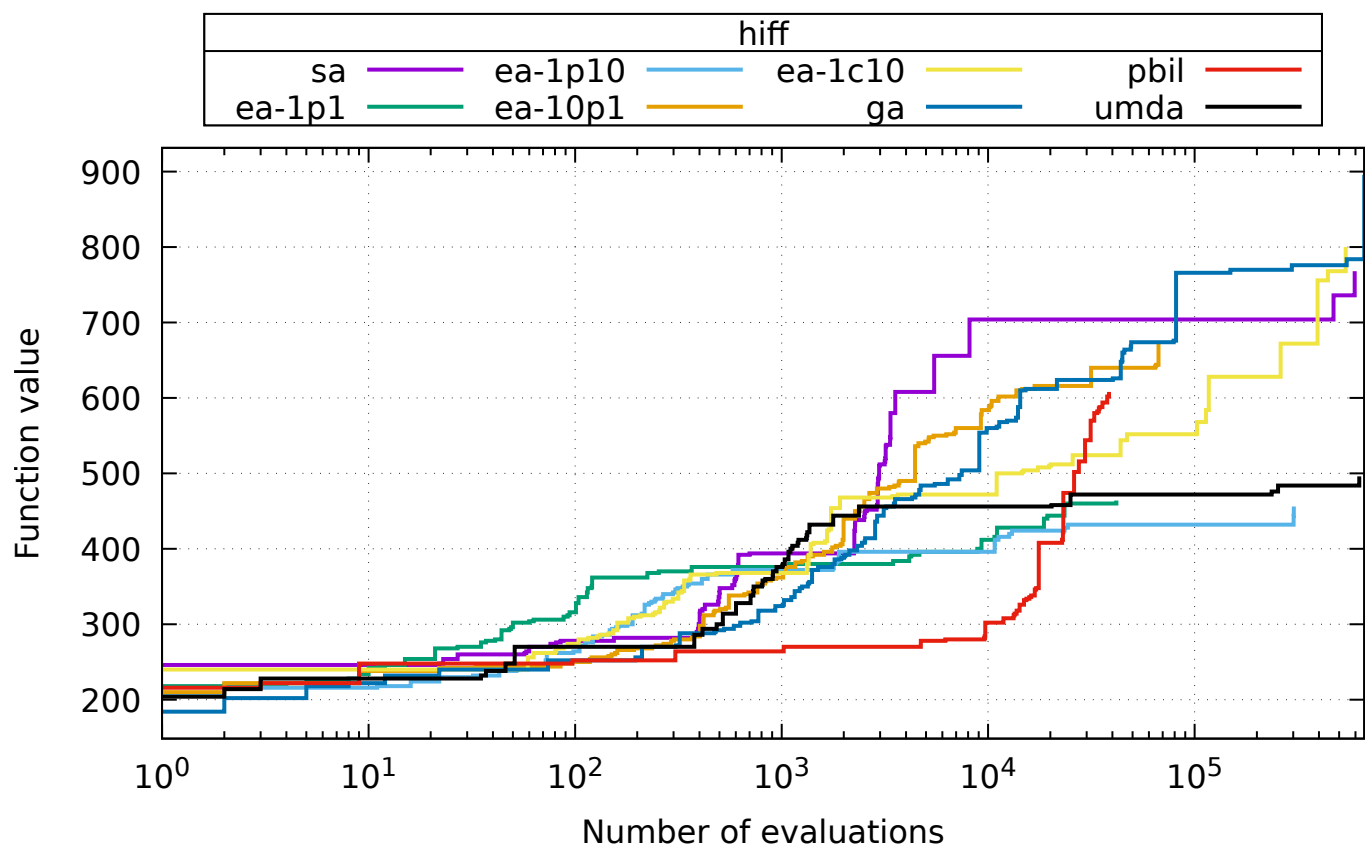
18 plateau
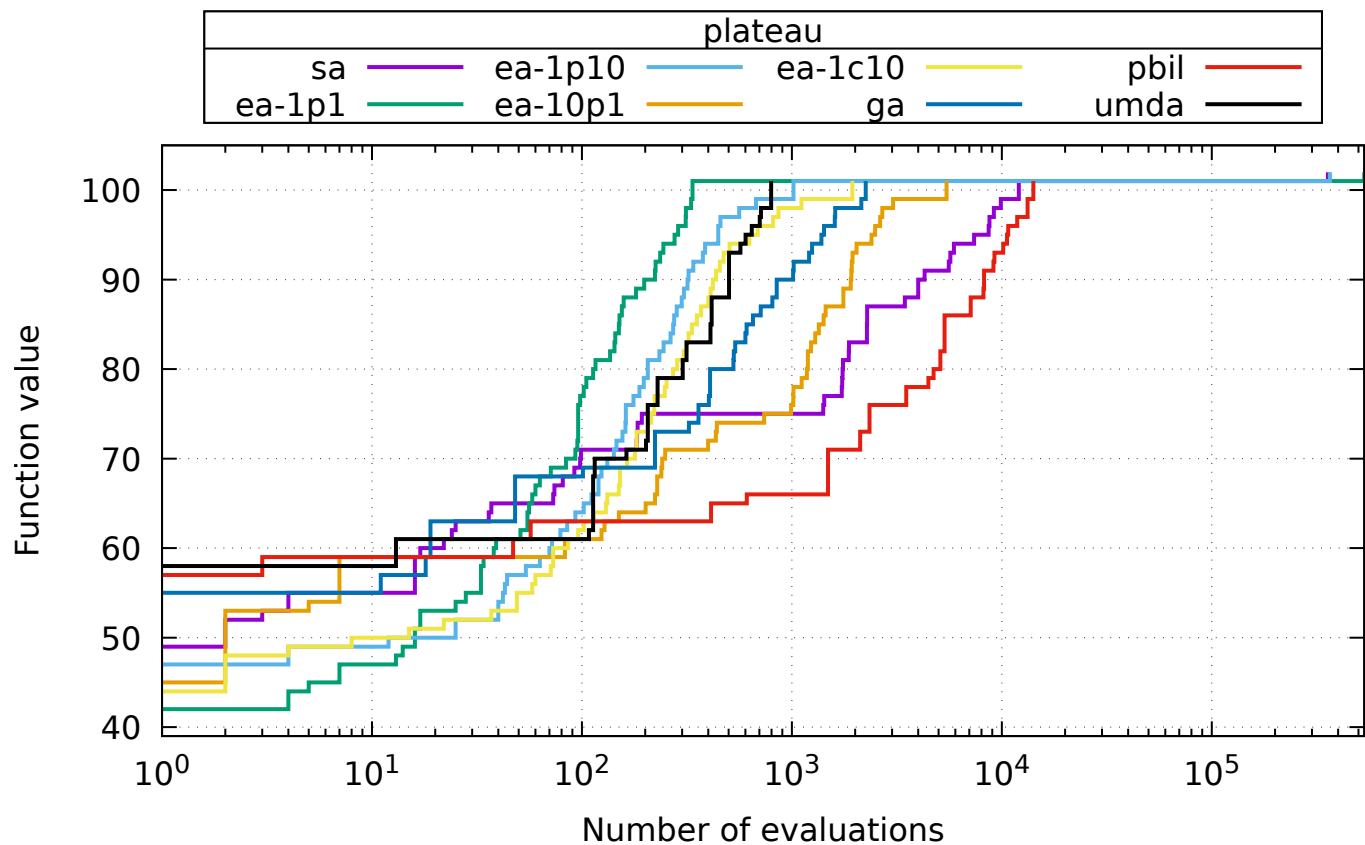
19 walsh2
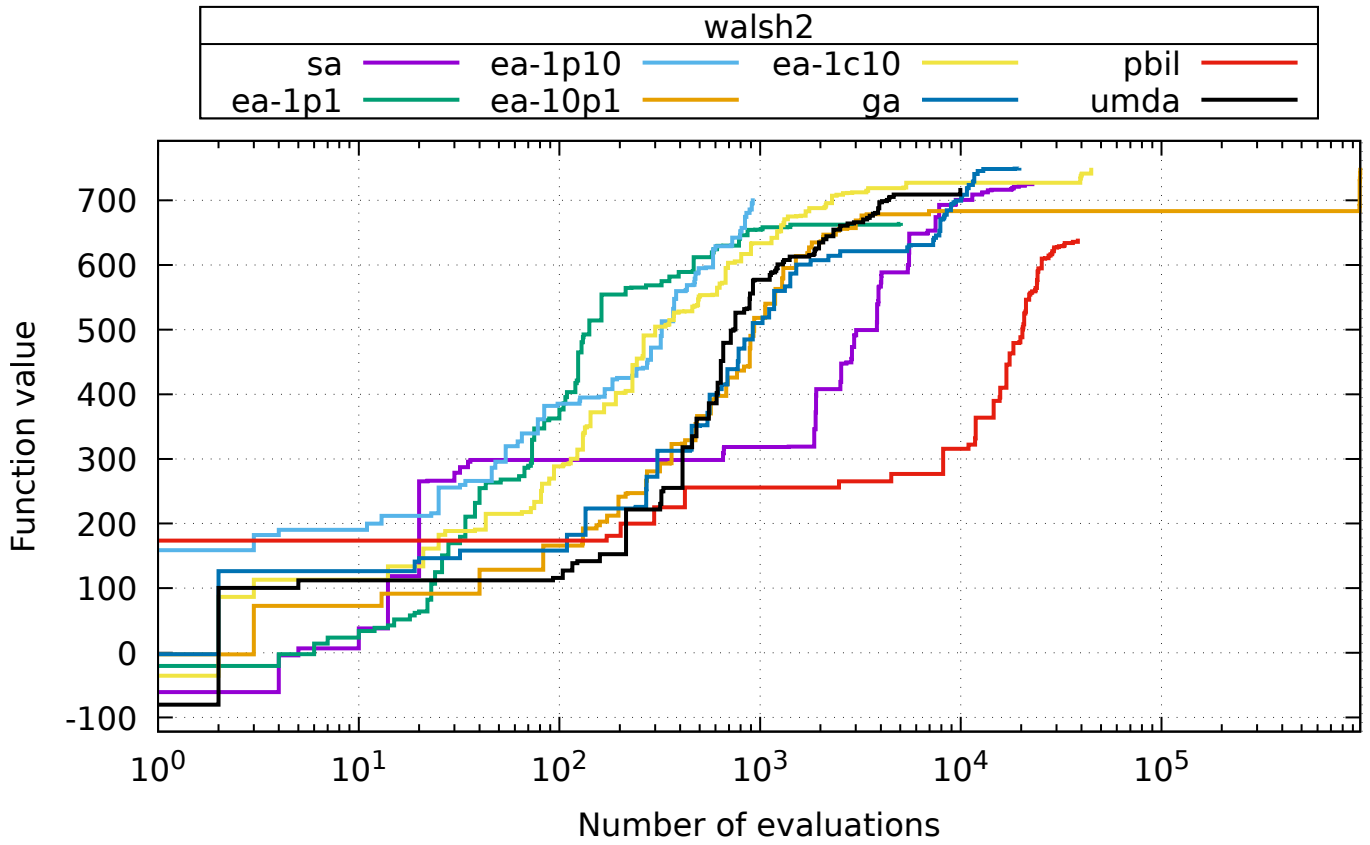
A Plan

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    "exec": "hnco",
    "opt": "--log-improvement --map 1 --map-random -s 100 -b 1000000",
    "parallel": true,
    "results": "results",
    "graphics": "graphics",
    "report": "report",
    "functions": [
        {
            "id": "one-max",
            "opt": "-F 0 --stop-on-maximum"
        },
        {
            "id": "lin",
            "opt": "-F 1 -p instances/lin.100"
        },
        {
            "id": "leading-ones",
            "opt": "-F 10 --stop-on-maximum"
        },
        {
            "id": "ridge",
            "opt": "-F 11 --stop-on-maximum"
        },
        {
            "id": "jmp-5",
            "opt": "-F 30 --stop-on-maximum -t 5"
        },
        {
            "id": "jmp-10",
            "opt": "-F 30 --stop-on-maximum -t 10"
```

```json
    },
    {
        "id": "djmp-5",
        "opt": "-F 31 --stop-on-maximum -t 5"
    },
    {

        "id": "djmp-10",
        "opt": "-F 31 --stop-on-maximum -t 10"
    },
    {

        "id": "fp-5",
        "opt": "-F 40 --stop-on-maximum -t 5"
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    {

        "id": "fp-10",
        "opt": "-F 40 --stop-on-maximum -t 10"
    },
    {

        "id": "nk",
        "opt": "-F 60 -p instances/nk.100.4"
    },
    {

        "id": "max-sat",
        "opt": "-F 70 -p instances/ms.100.3.1000"
    },
    {

        "id": "labs",
        "opt": "-F 81"
    },
    {

        "id": "ep",
        "opt": "-F 90 -p instances/ep.100",
        "reverse": true,
        "logscale": true
    },
    {

        "id": "cancel",
        "opt": "-F 100 -s 99",
        "reverse": true
    },
    {

        "id": "trap",
        "opt": "-F 110 --stop-on-maximum --fn-num-traps 10"
    },
    {

        "id": "hiff",
        "opt": "-F 120 --stop-on-maximum -s 128"
    },
    {

        "id": "plateau",
        "opt": "-F 130 --stop-on-maximum"
    },
    {

        "id": "walsh2",
        "opt": "-F 162 -p instances/walsh2.100"
    }
],
"algorithms": [
    {
        "id": "sa",
        "opt": "-A 200 --sa-beta-ratio 1.05 --sa-num-trials 10"
    },
    {
```

```
            "id": "ea-1p1",
            "opt": "-A 300"
        },
        {

            "id": "ea-1p10",
            "opt": "-A 310 --ea-mu 1 --ea-lambda 10"
        },
        {

            "id": "ea-10p1",
            "opt": "-A 310 --ea-mu 10 --ea-lambda 1"
        },
        {

            "id": "ea-1c10",
            "opt": "-A 320 --ea-mu 1 --ea-lambda 10 --allow-no-mutation"
        },
        {

            "id": "ga",
            "opt": "-A 400 --ea-mu 100"
        },
        {

            "id": "pbil",
            "opt": "-A 500 -l 5e-3"
        },
        {

            "id": "umda",
            "opt": "-A 600 -x 100 -y 10"
        }
    ]
}
```

B Default parameters

```
# algorithm = 100
# bm_mc_reset_strategy = 1
# bm_num_gs_cycles = 1
# bm_num_gs_steps = 100
# bm_sampling = 1
# budget = 10000
# bv_size = 100
# description_path = description.txt
# ea_lambda = 100
# ea_mu = 10
# expression = x
# fn_name = noname
# fn_num_traps = 10
# fn_prefix_length = 2
# fn_threshold = 10
# fp_expression = (1-x)^2+100*(y-x^2)^2
# fp_lower_bound = -2
# fp_num_bits = 8
# fp_upper_bound = 2
# function = 0
# ga_crossover_bias = 0.5
# ga_crossover_probability = 0.5
# ga_tournament_size = 10
# hea_bit_herding = 0
# hea_num_seq_updates = 100
# hea_reset_period = 0
# hea_sampling_method = 0
# hea_weight = 1
# learning_rate = 0.001
# map = 0
```

```
# map_input_size = 100
# map_path = map.txt
# map_ts_length = 10
# map_ts_sampling_mode = 0
# mutation_rate = 1
# neighborhood = 0
# neighborhood_iterator = 0
# noise_stddev = 1
# num_iterations = 0
# num_threads = 1
# path = function.txt
# pn_mutation_rate = 1
# pn_neighborhood = 0
# pn_radius = 2
# population_size = 10
# pv_log_num_components = 5
# radius = 2
# results_path = results.json
# rls_patience = 50
# sa_beta_ratio = 1.2
# sa_initial_acceptance_probability = 0.6
# sa_num_transitions = 50
# sa_num_trials = 100
# seed = 0
# selection_size = 1
# solution_path = solution.txt
# target = 100
# print_defaults
# last_parameter
# exec_name = hnco
# version = 0.15
# Generated from hnco.json
```