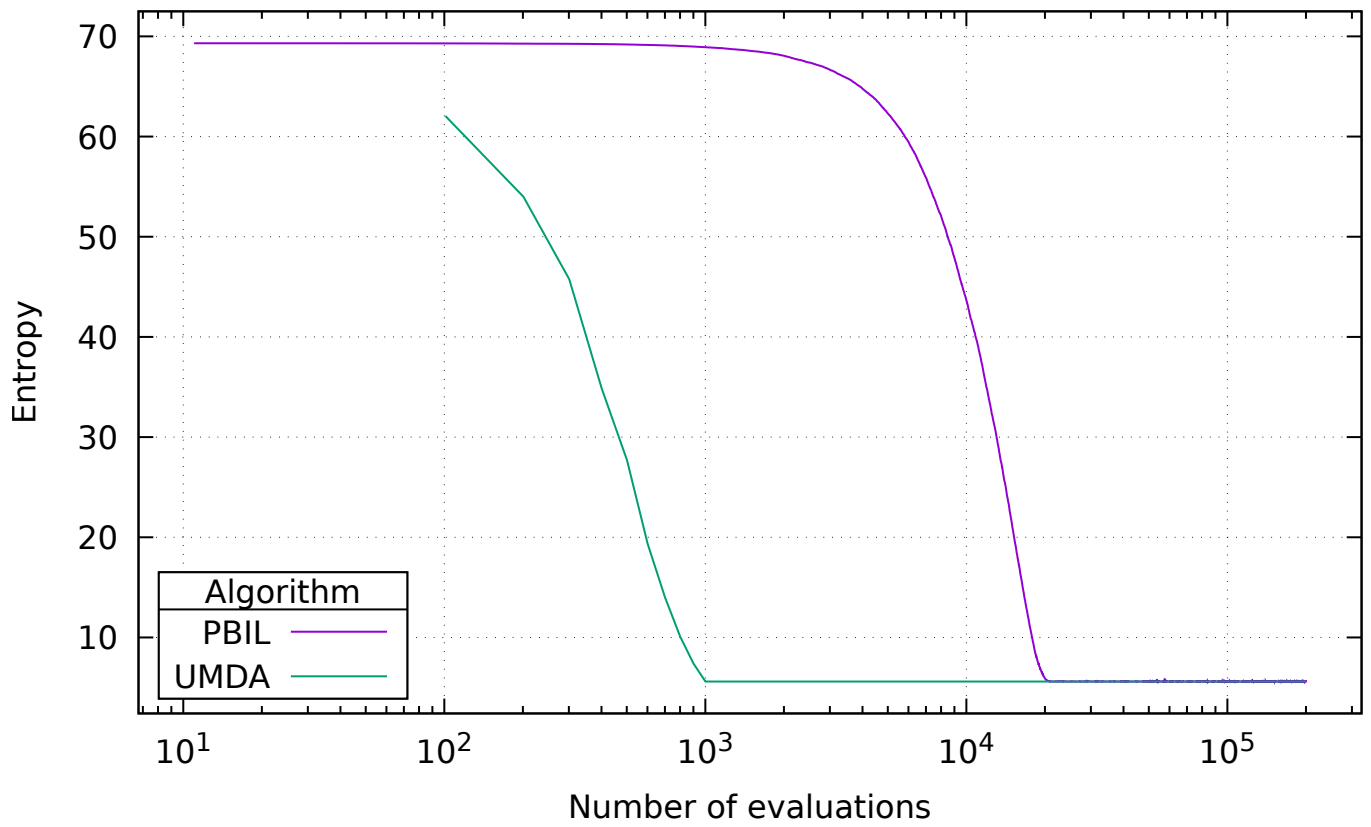# HNCO
Evolution of entropy
in PBIL and UMDA

December 30, 2022
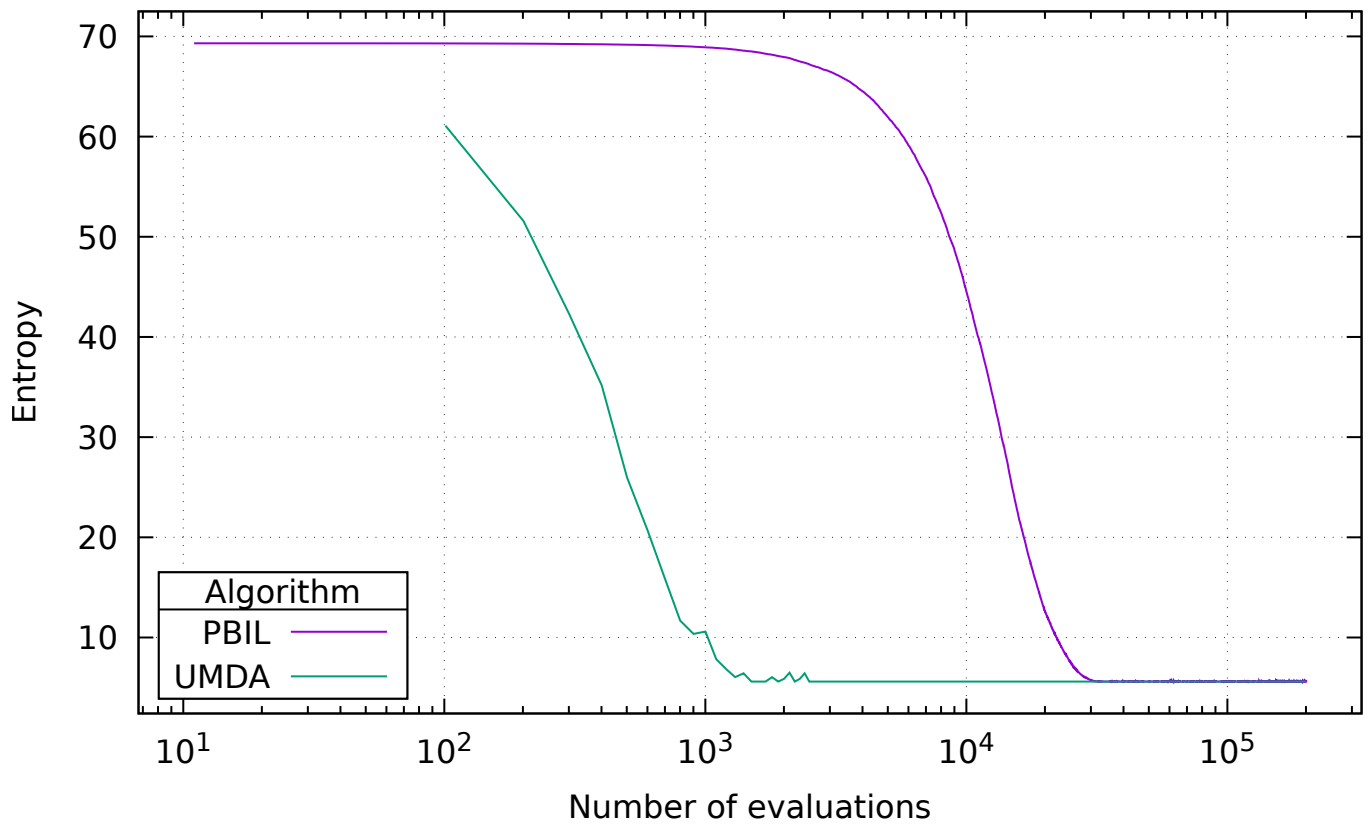
Contents
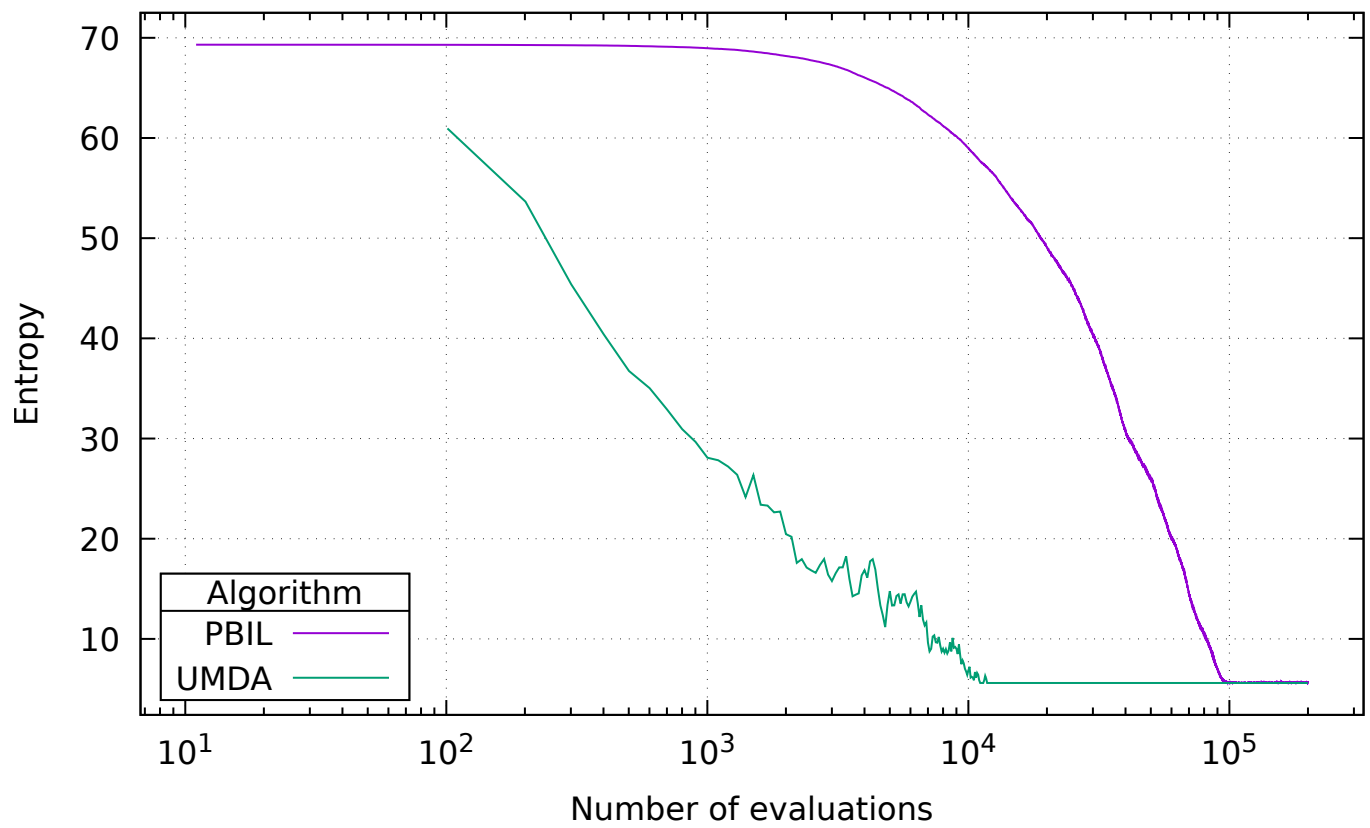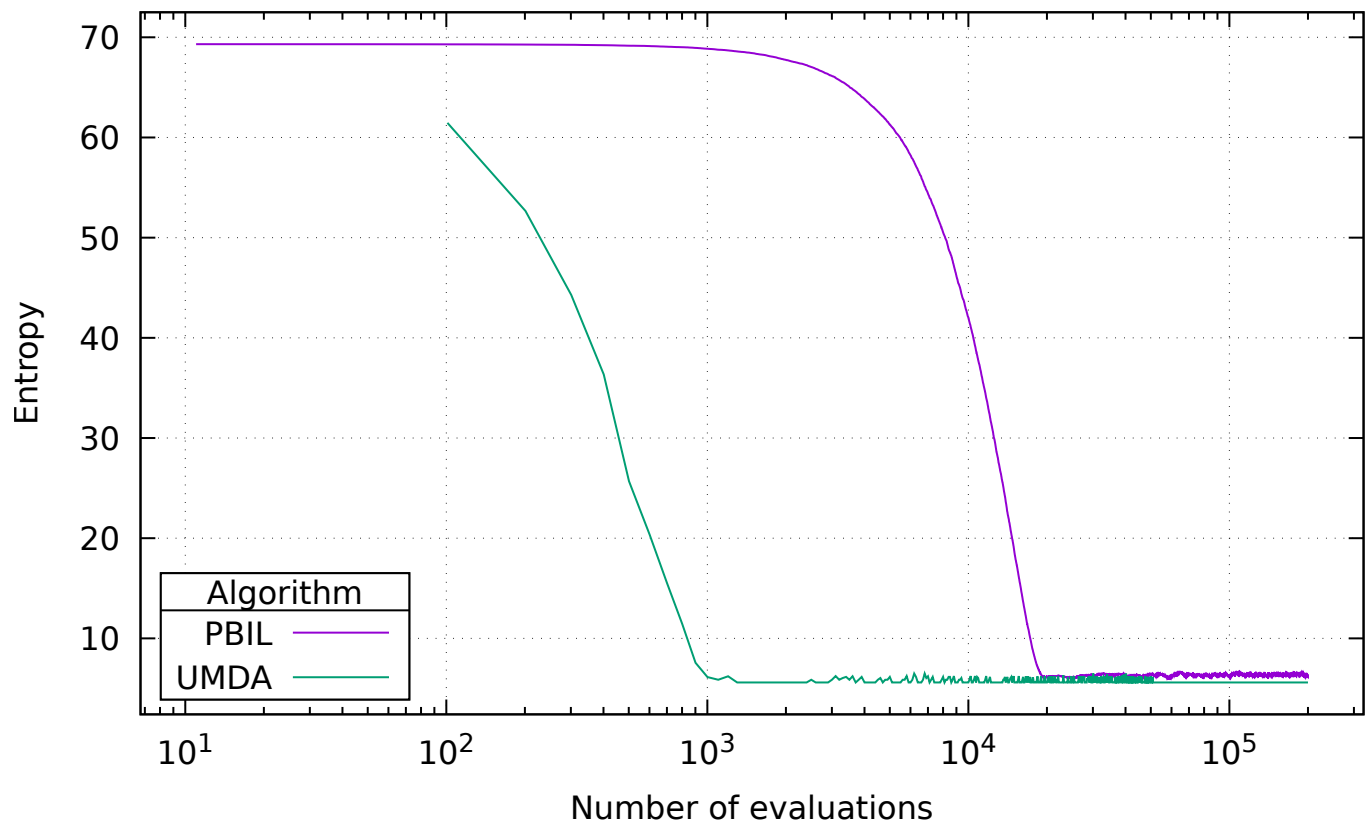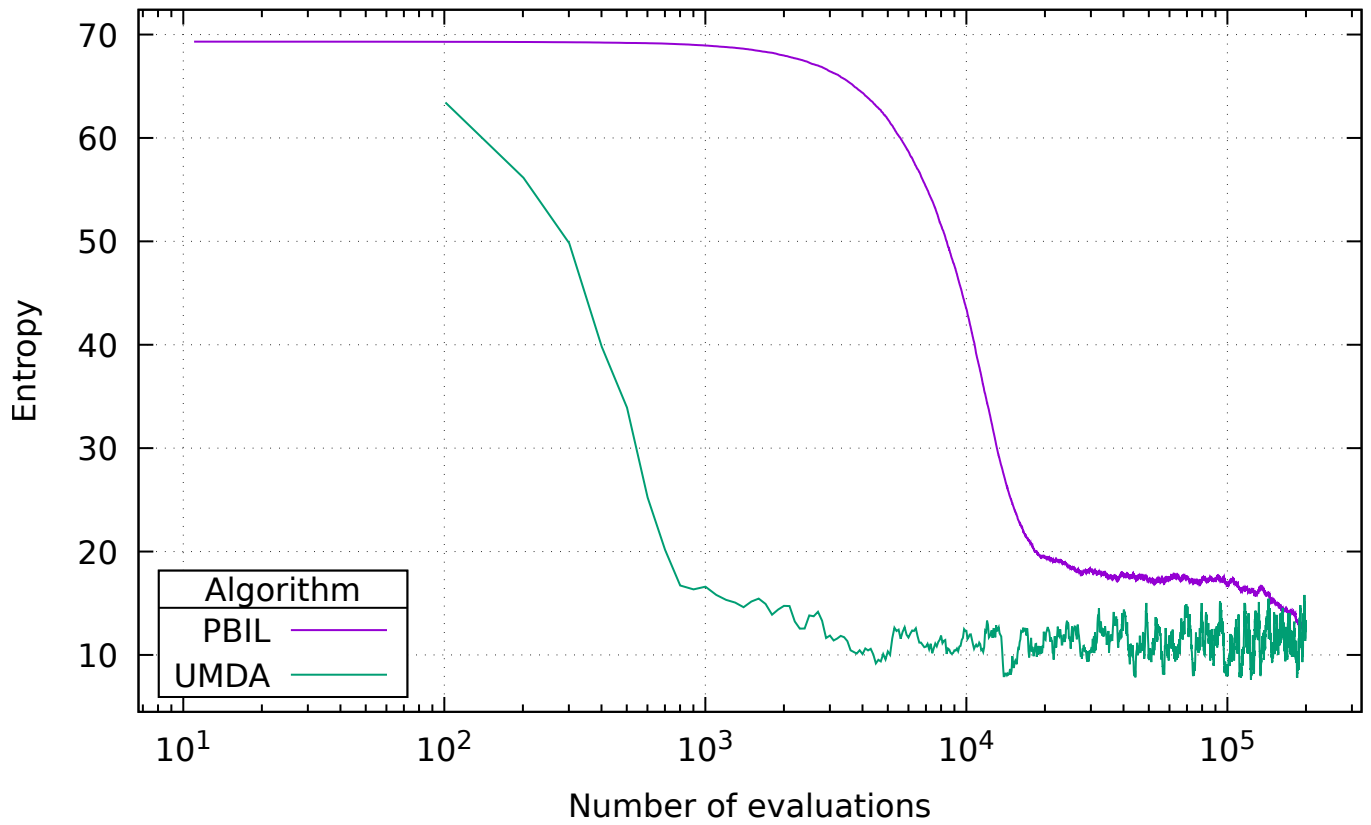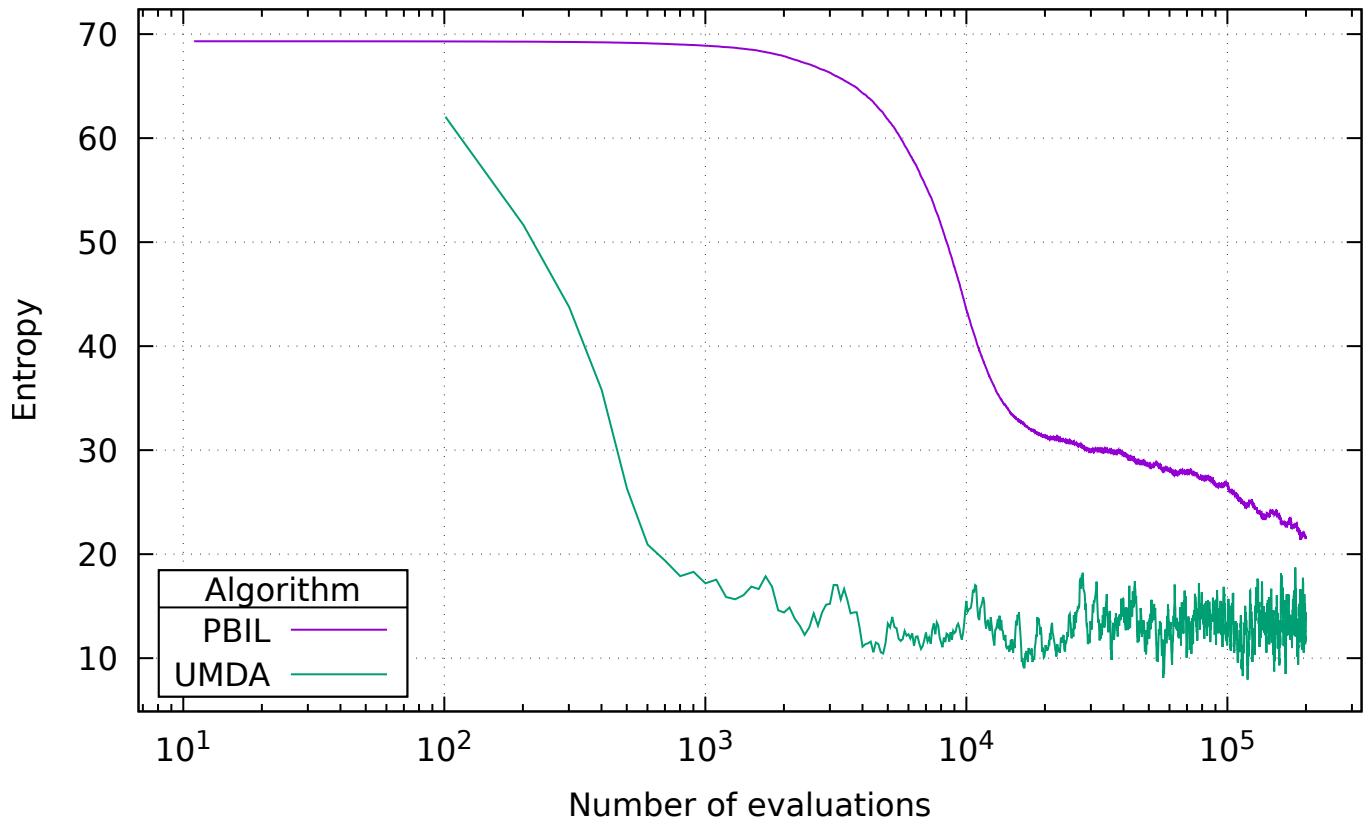
1   OneMax
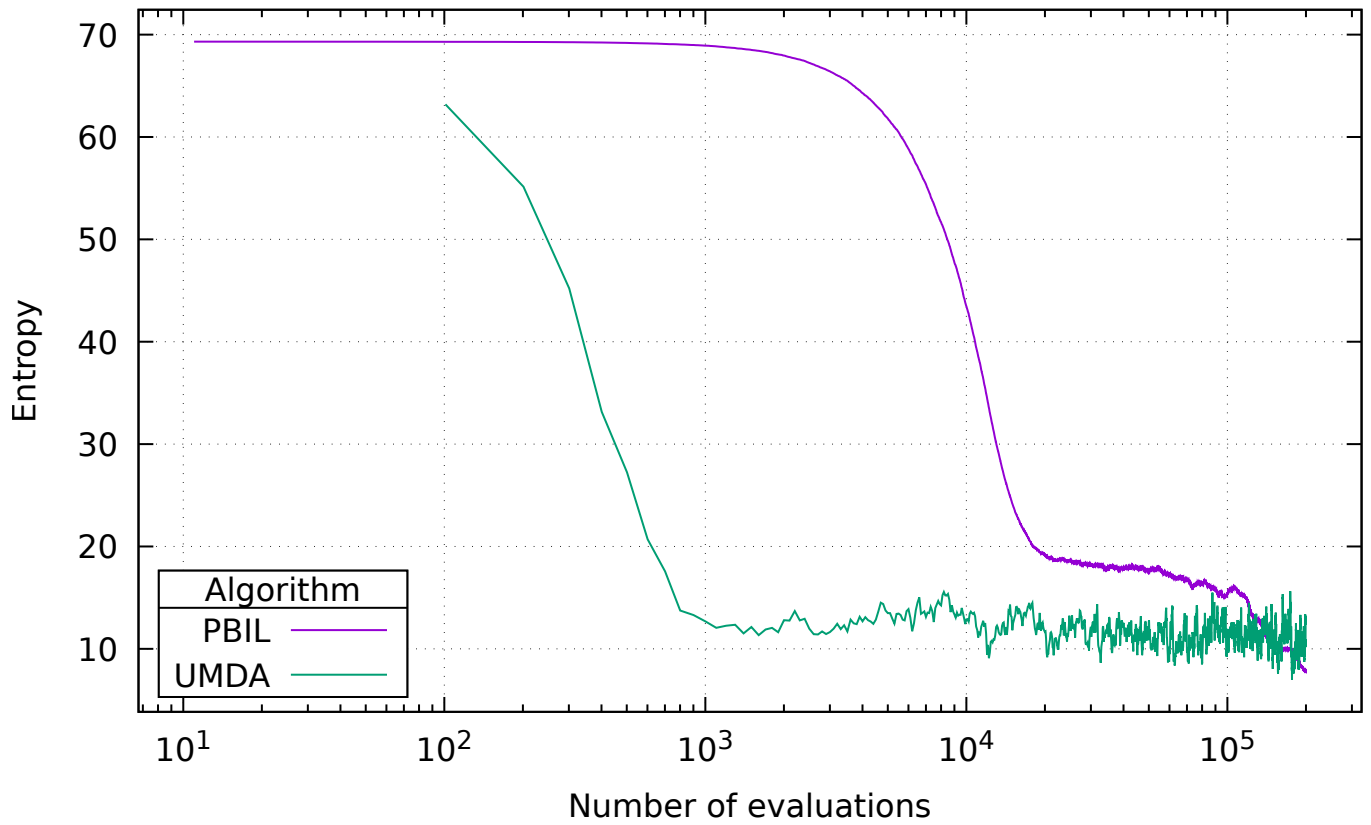

2   Linear
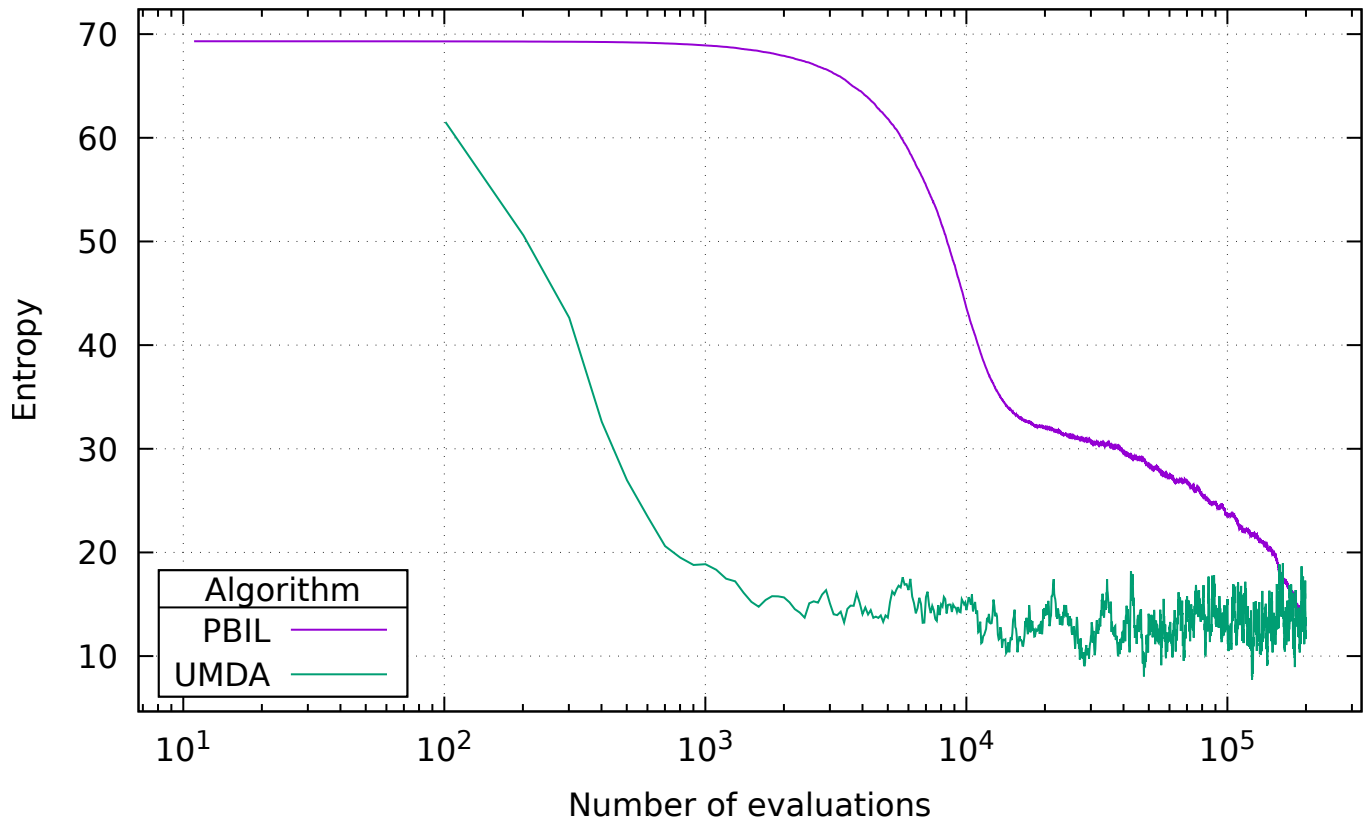
3 LeadingOnes

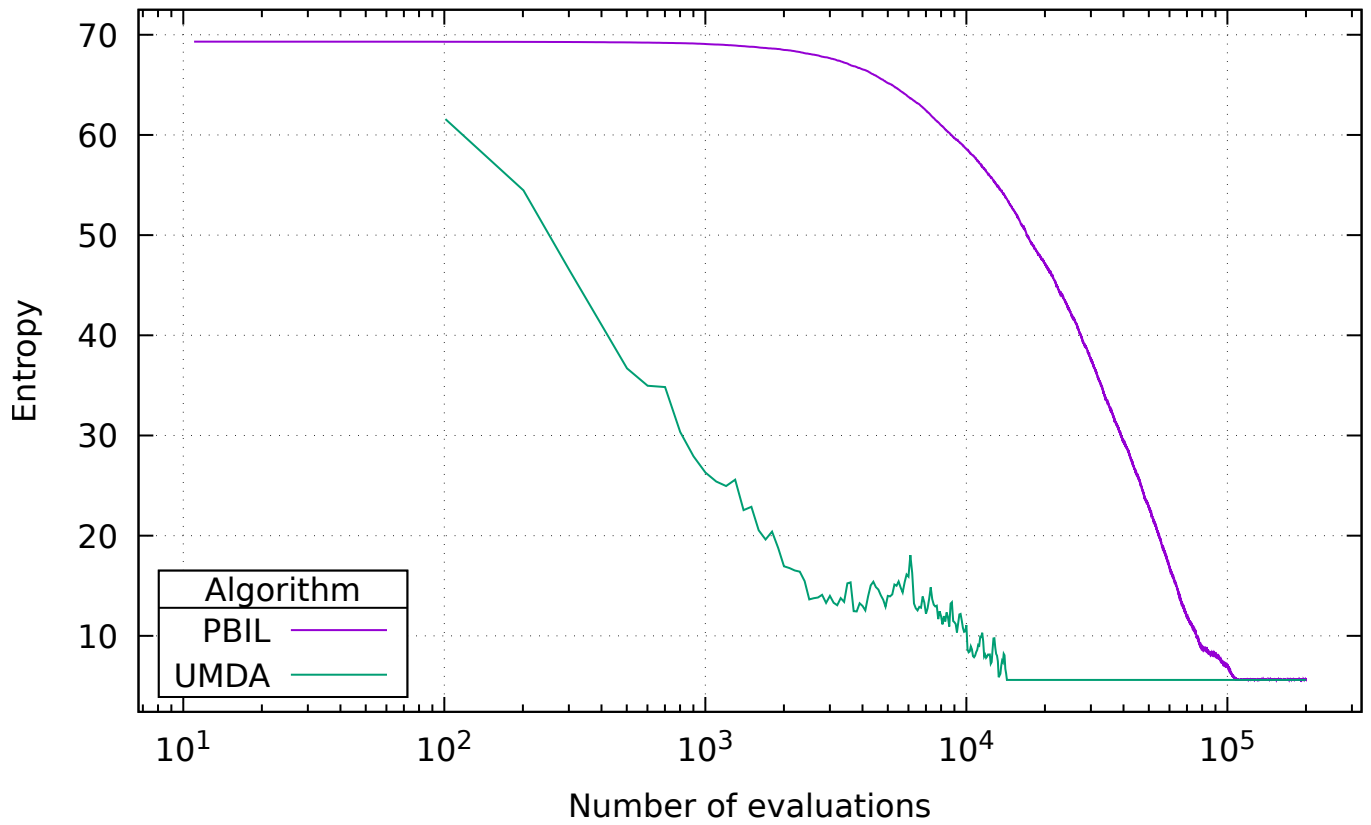
4 Ridge

5   Jump (5)

6   Jump (10)

7 Deceptive Jump (5)

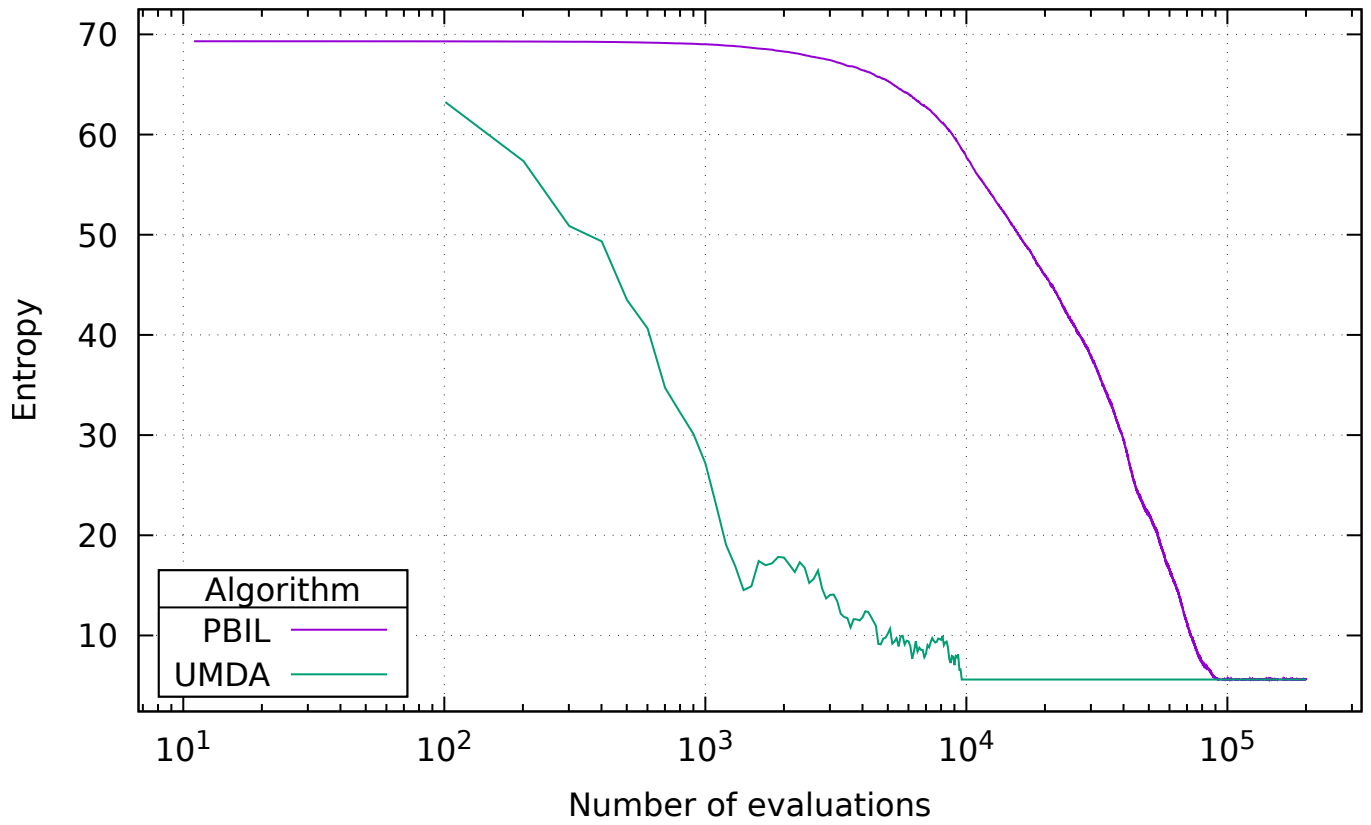
8 Deceptive Jump (10)

9   Four peaks (5)

10   Four peaks (5)

11   Nk landscape
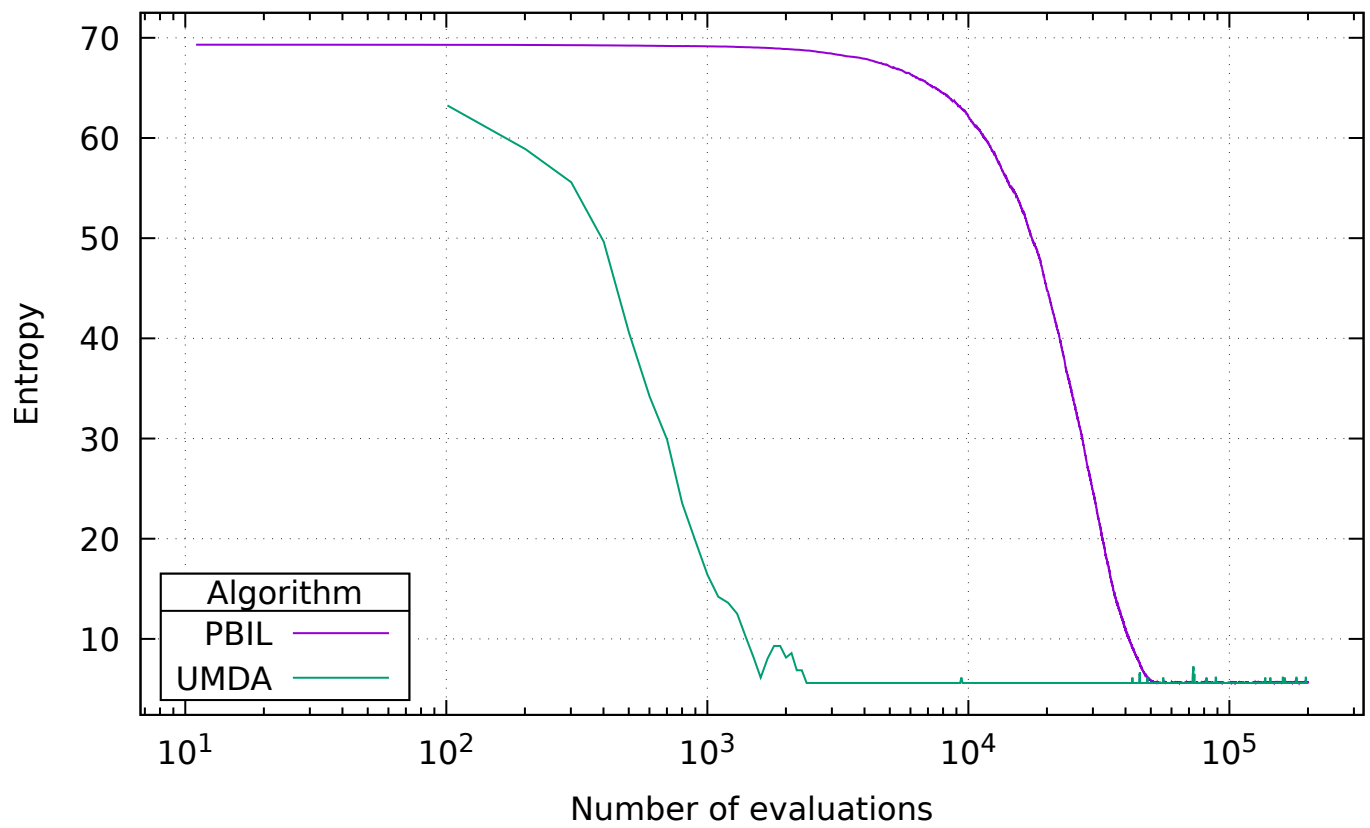
12   MAX-SAT
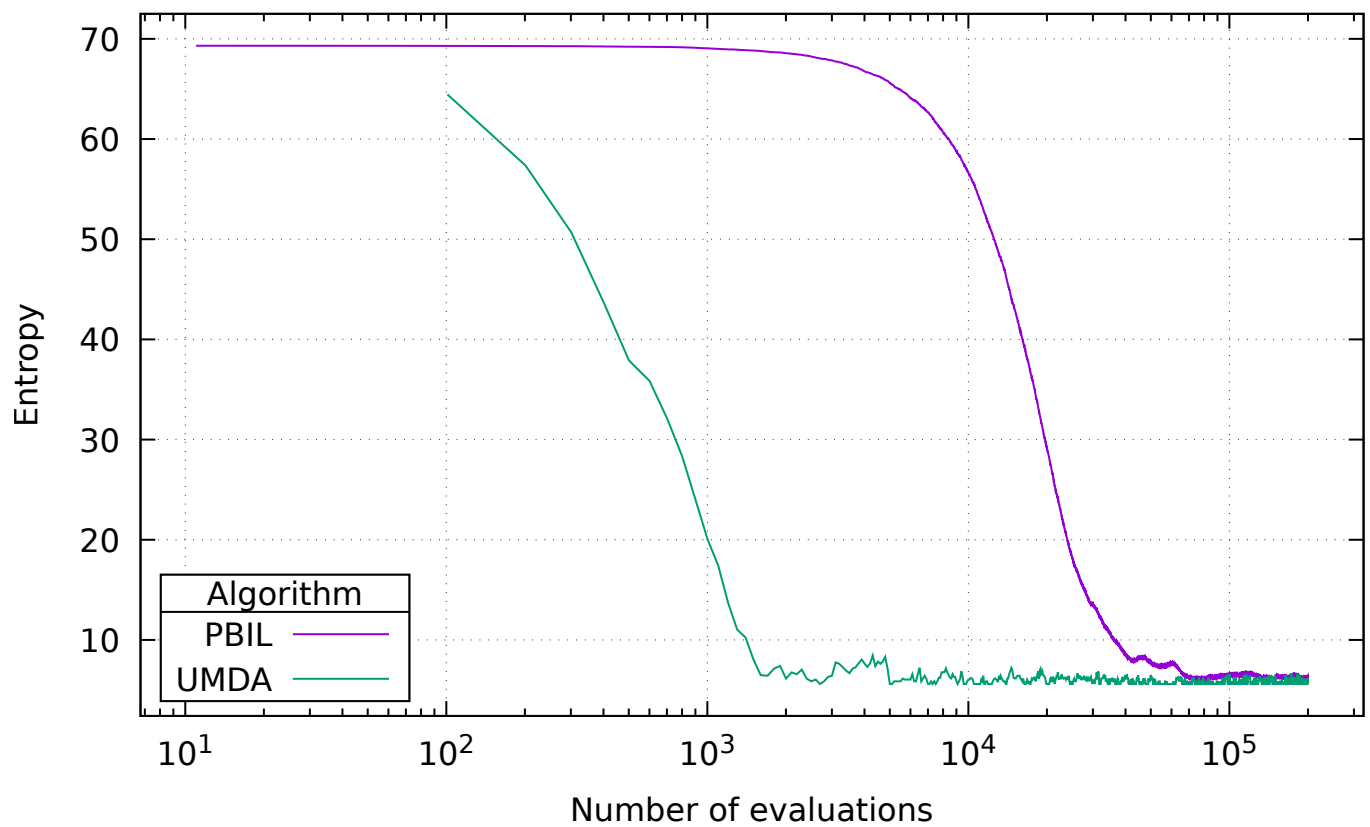
13 LABS
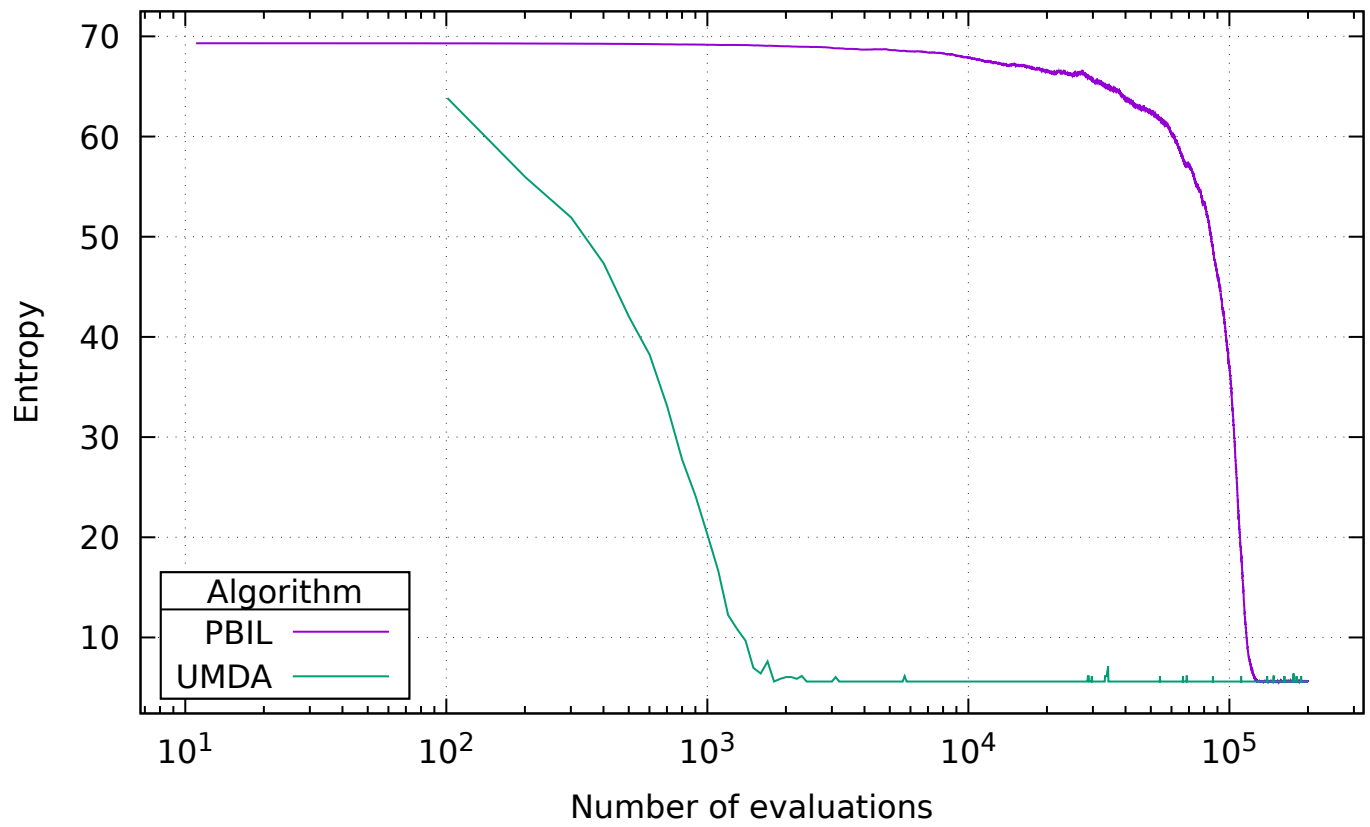
14 Equal Product
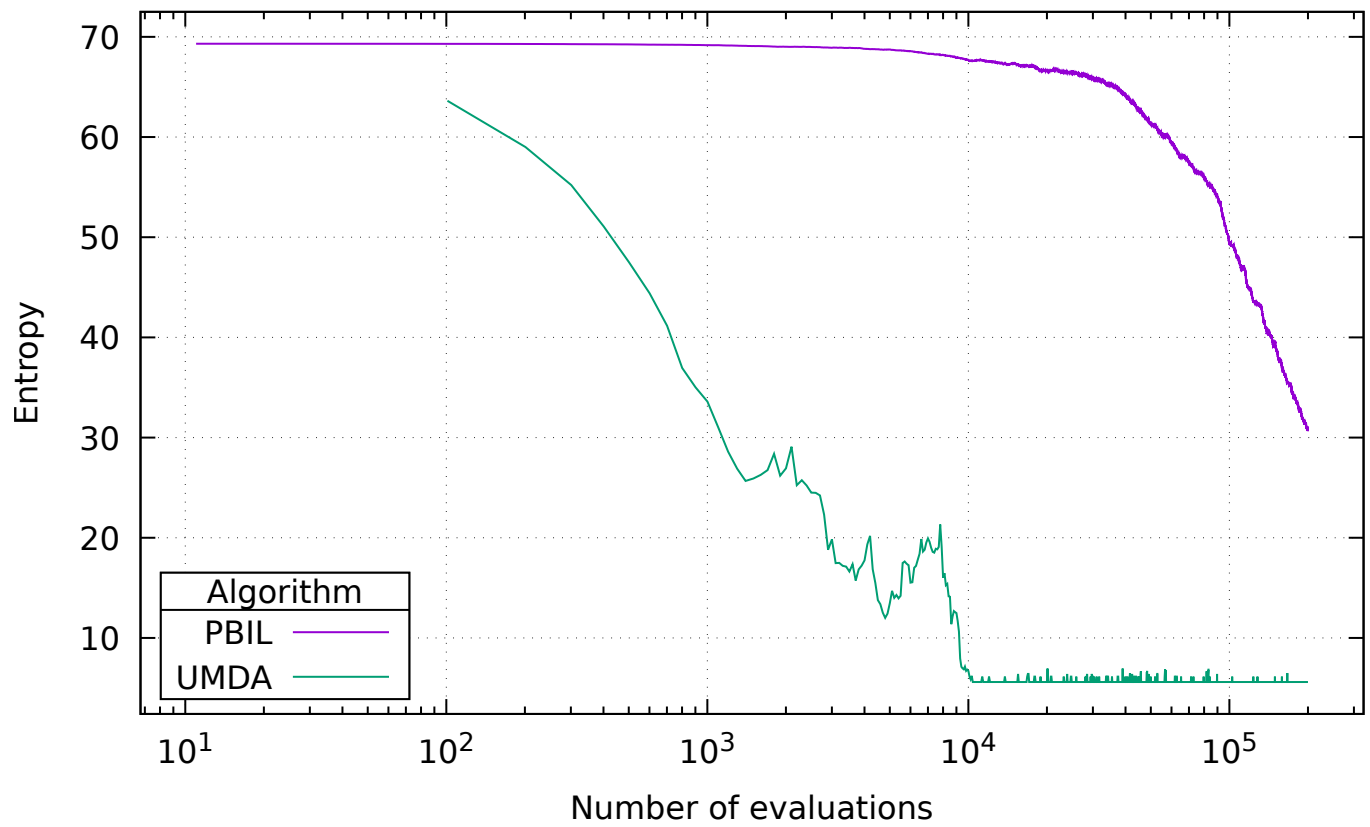
15 Cancellation
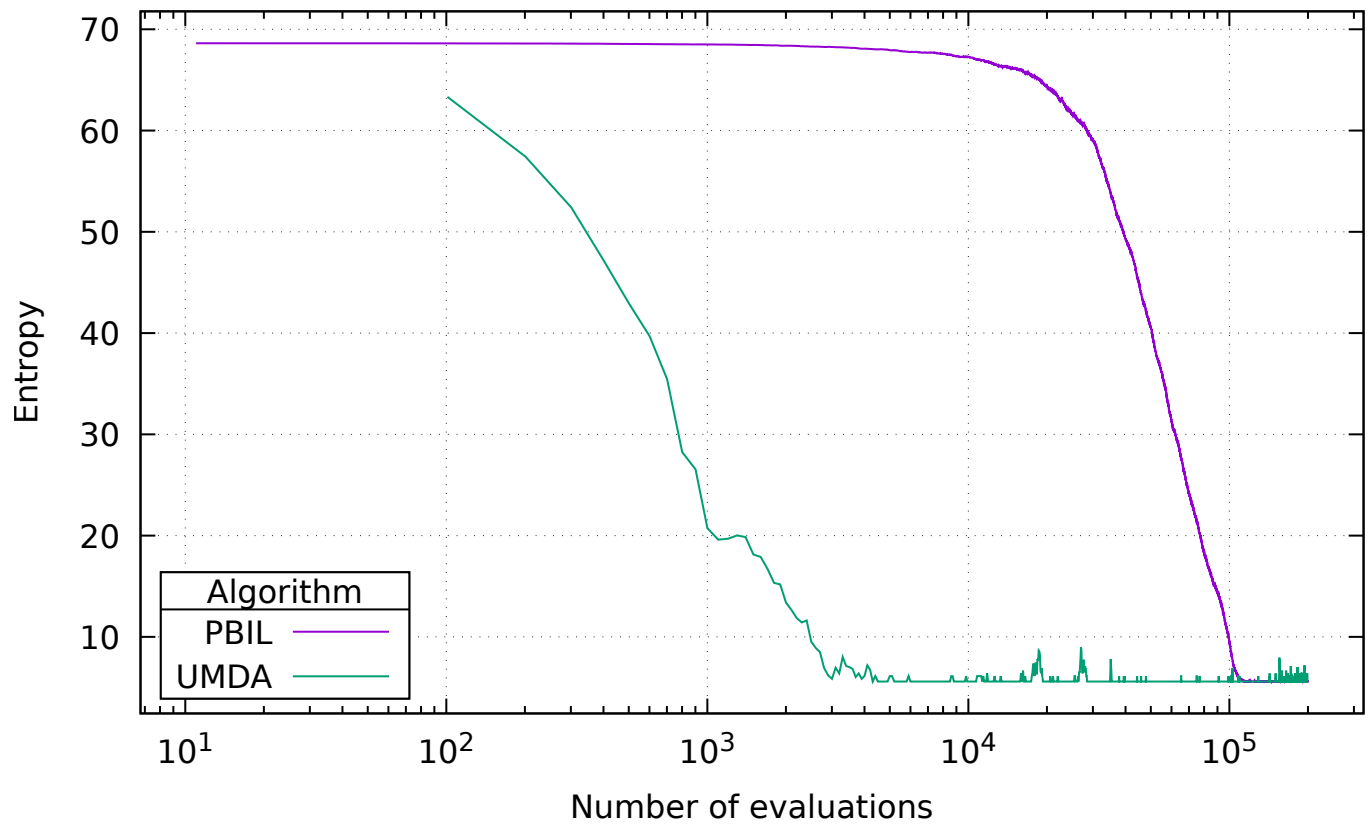
16 Trap
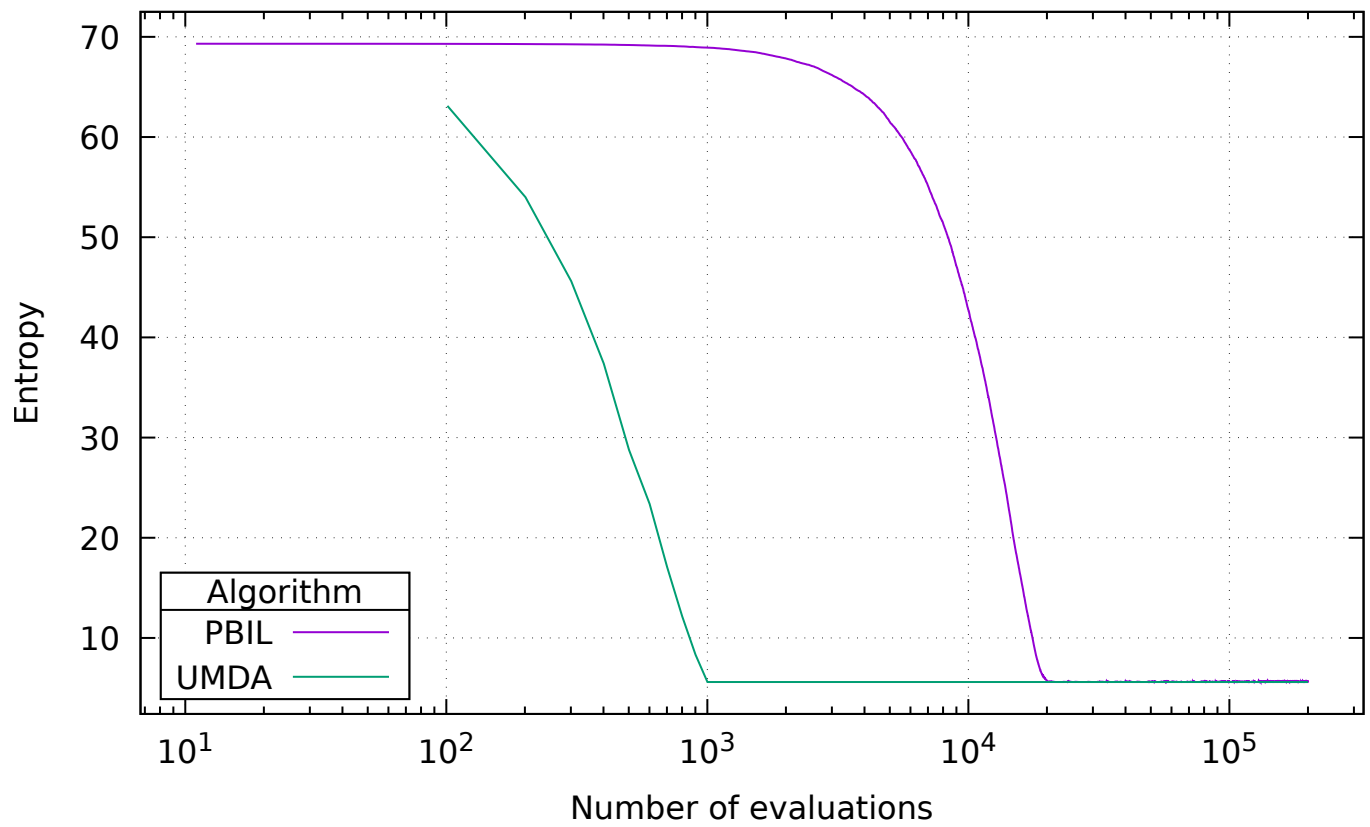
17 H-iff
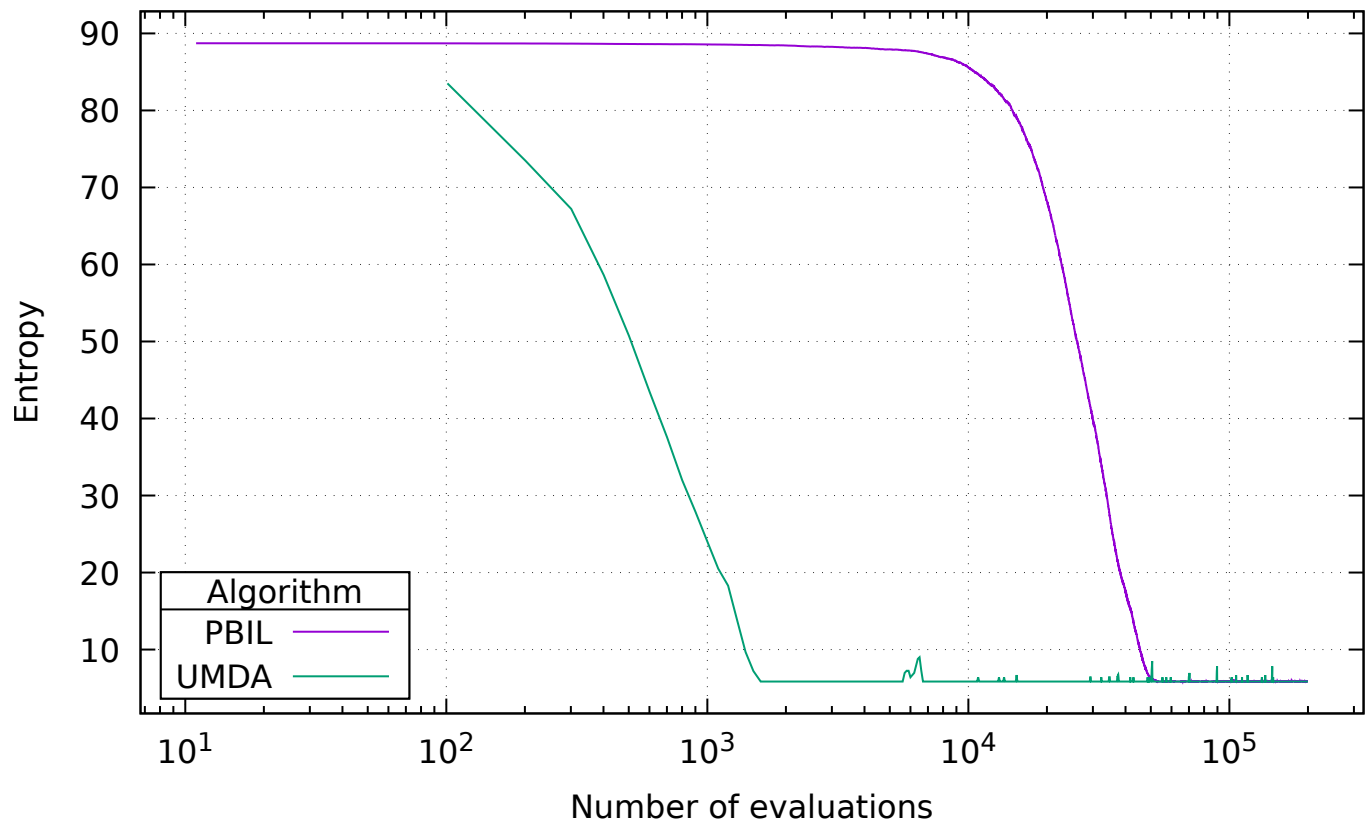
18 Plateau
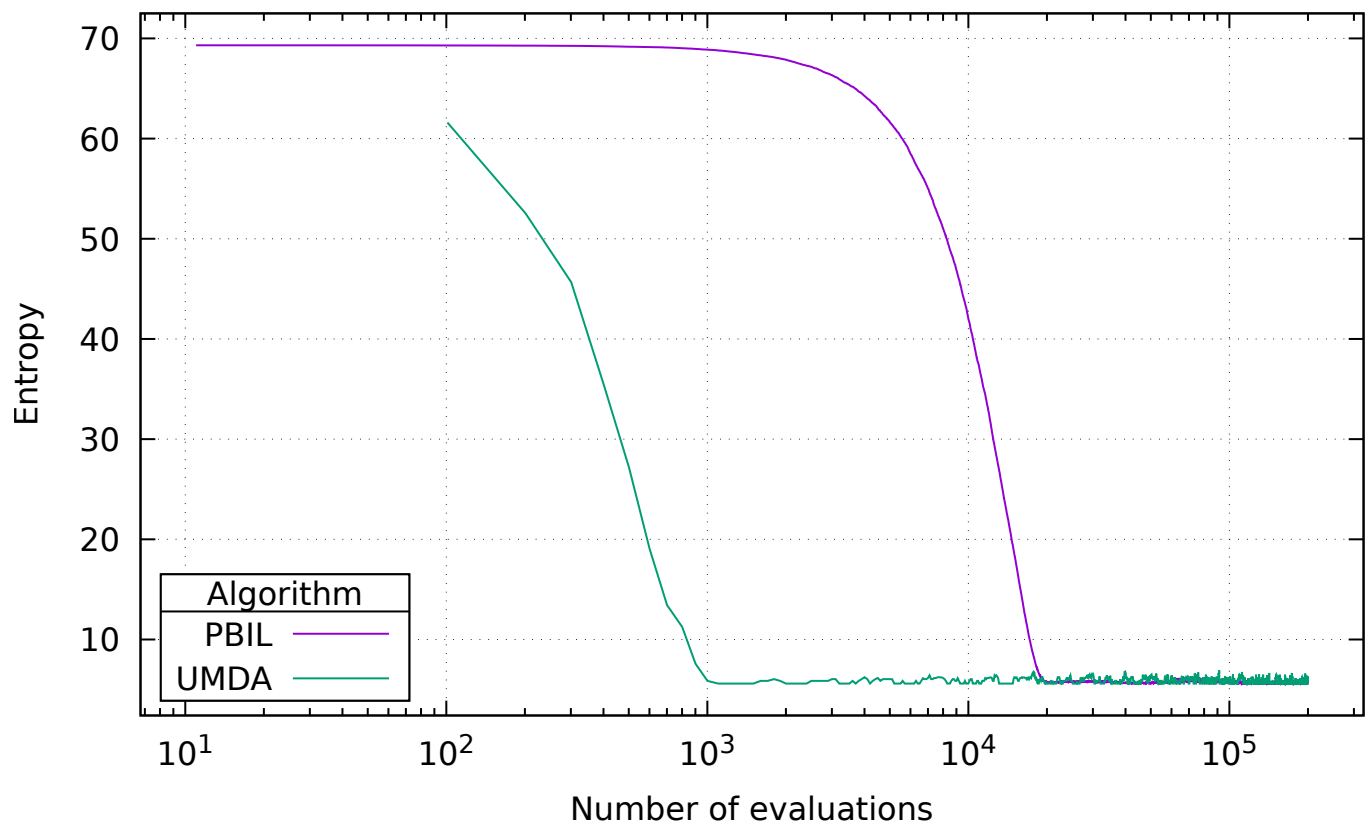
19 Walsh (second order)
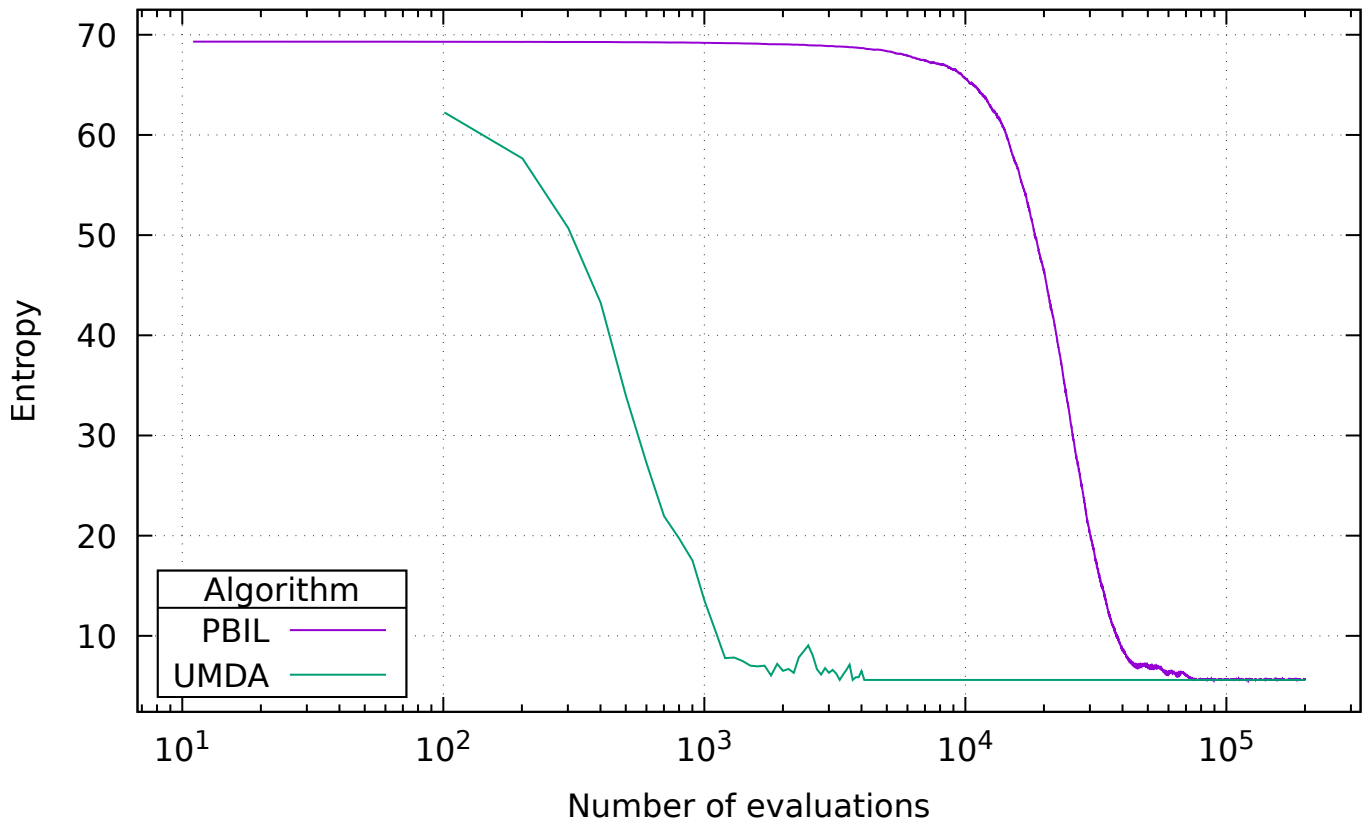
A Plan

```
{
    "exec": "hnco",
    "opt": "--map 1 --map-random -s 100 -b 200001 --pv-log-entropy",
    "parallel": true,
    "graphics": {
        "key": "inside bottom left opaque box vertical title \"Algorithm\" center width +1.5 spacing
↪   1.2",
        "xlabel": "Number of evaluations",
        "xcolumn": 1,
        "xlogscale": true,
        "ylabel": "Entropy",
        "ycolumn": 4,
        "ylogscale": false
    },
    "functions": [
        {
            "id": "one-max",
            "label": "OneMax",
            "opt": "-F 0"
        },
        {
            "id": "lin",
            "label": "Linear",
            "opt": "-F 1 -p instances/lin.100"
        },
        {
            "id": "leading-ones",
            "label": "LeadingOnes",
            "opt": "-F 10"
        },
```

```json
{
    "id": "ridge",
    "label": "Ridge",
    "opt": "-F 11"
},
{

    "id": "jmp-5",
    "label": "Jump (5)",
    "opt": "-F 30 -t 5"
},
{

    "id": "jmp-10",
    "label": "Jump (10)",
    "opt": "-F 30 -t 10"
},
{

    "id": "djmp-5",
    "label": "Deceptive Jump (5)",
    "opt": "-F 31 -t 5"
},
{

    "id": "djmp-10",
    "label": "Deceptive Jump (10)",
    "opt": "-F 31 -t 10"
},
{

    "id": "fp-5",
    "label": "Four peaks (5)",
    "opt": "-F 40 -t 5"
},
{

    "id": "fp-10",
    "label": "Four peaks (5)",
    "opt": "-F 40 -t 10"
},
{

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

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

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

    "id": "ep",
    "label": "Equal Product",
    "opt": "-F 90 -p instances/ep.100"
},
{

    "id": "cancel",
    "label": "Cancellation",
    "opt": "-F 100 -s 99"
},
{

    "id": "trap",
    "label": "Trap",
```

```
            "opt": "-F 110 --fn-num-traps 10"
        },
        {
            "id": "hiff",
            "label": "H-iff",
            "opt": "-F 120 -s 128"
        },
        {
            "id": "plateau",
            "label": "Plateau",
            "opt": "-F 130"
        },
        {

            "id": "walsh2",
            "label": "Walsh (second order)",
            "opt": "-F 162 -p instances/walsh2.100"
        }
    ],
    "algorithms": [
        {
            "id": "pbil",
            "label": "PBIL",
            "opt": "-A 500 -x 10 -y 1 -l 5e-3"
        },
        {

            "id": "umda",
            "label": "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_crossover_bias = 0.5
# ea_crossover_probability = 0.5
# ea_lambda = 100
# ea_mu = 10
# ea_mutation_rate = 1
# ea_mutation_rate_max = 1
# ea_mutation_rate_min = 0.01
# ea_success_ratio = 4
# ea_tournament_size = 2
# ea_update_strength = 1.01
# 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_precision = 0.01
# fp_upper_bound = 2
```

```
# function = 0
# hea_reset_period = 0
# learning_rate = 0.001
# map = 0
# map_input_size = 100
# map_path = map.txt
# map_ts_length = 10
# map_ts_sampling_mode = 0
# 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
# rep_categorical_representation = 0
# rep_num_additional_bits = 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
# last_parameter
# exec_name = unknown
# version = 0.22
# Generated from hnco.json
```