

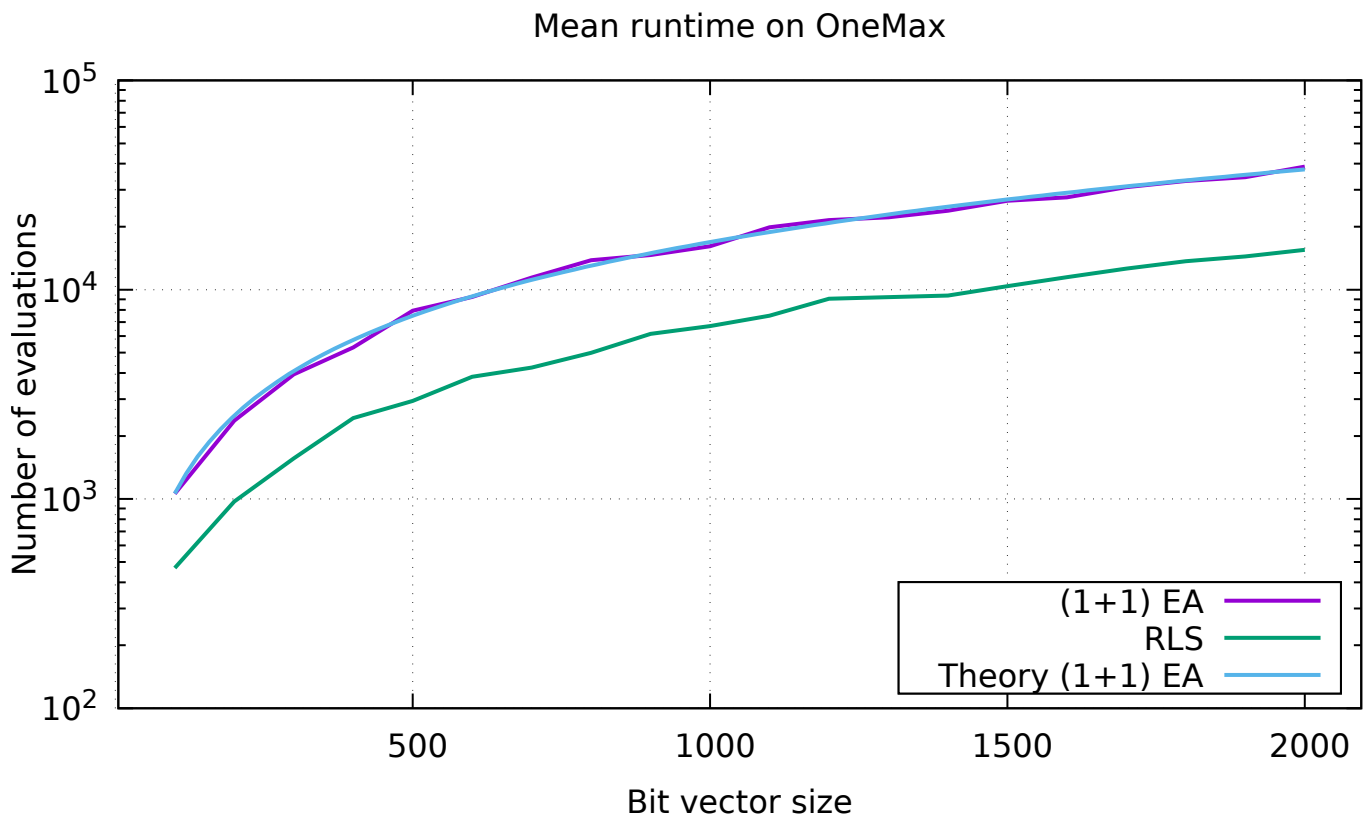
# HNCO

## Runtime as a function of size of (1+1) EA and RLS on OneMax and LeadingOnes

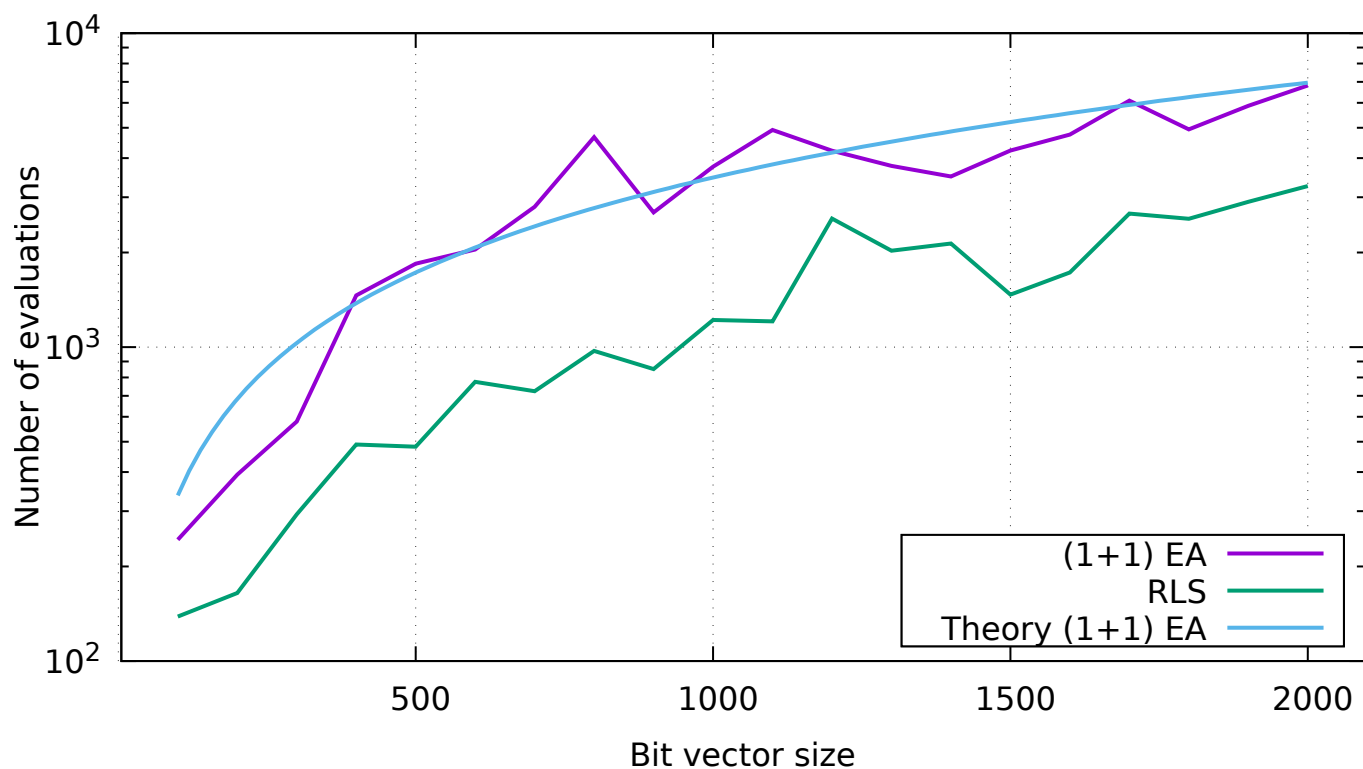
April 29, 2022

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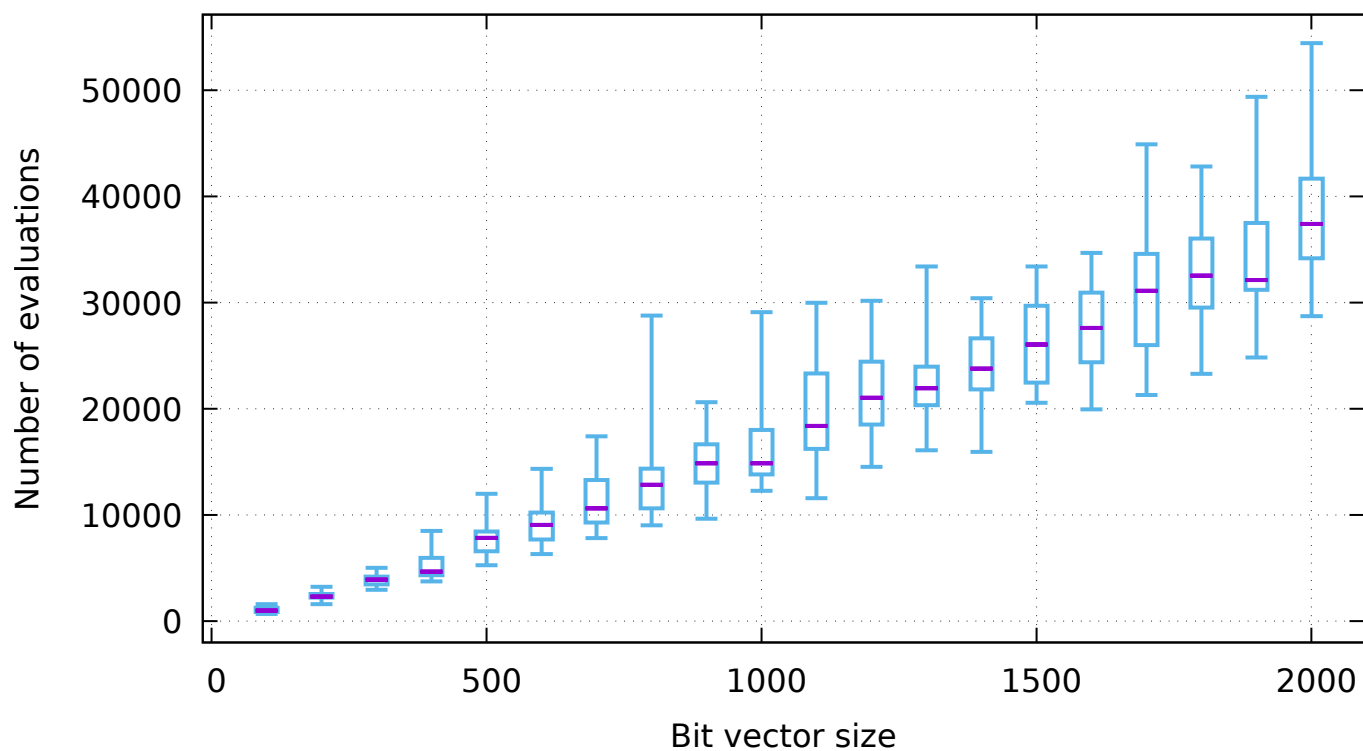
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1	Function OneMax	



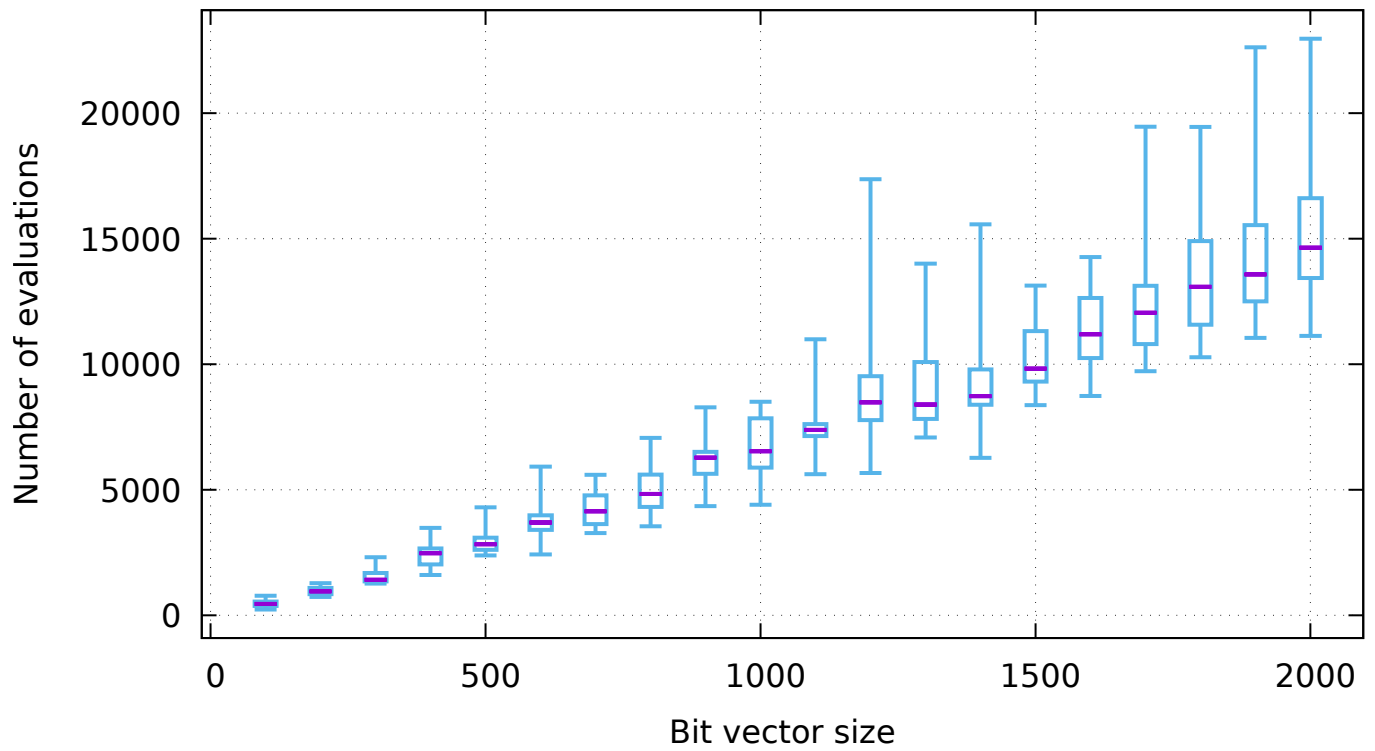
Standard deviation of runtime on OneMax



Runtime of (1+1) EA on OneMax

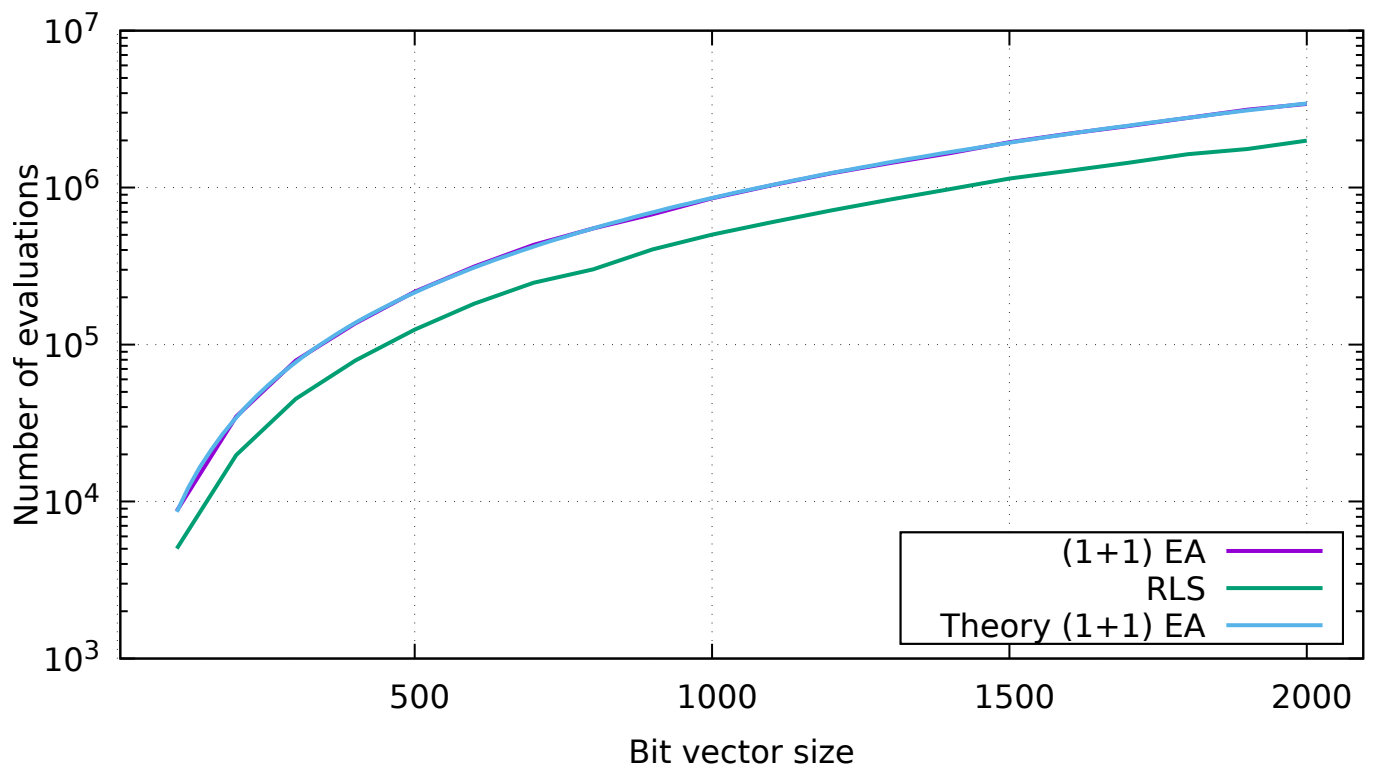


Runtime of RLS on OneMax

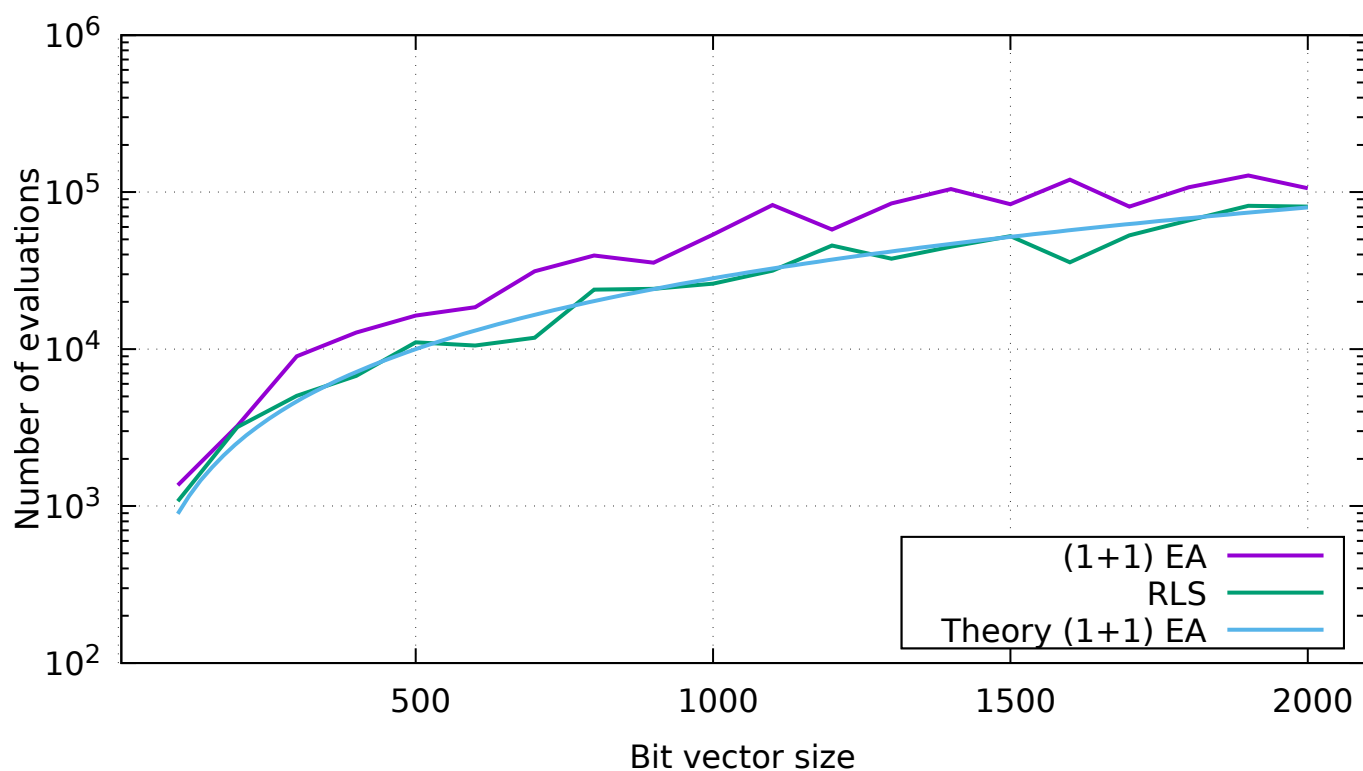


## 2 Function LeadingOnes

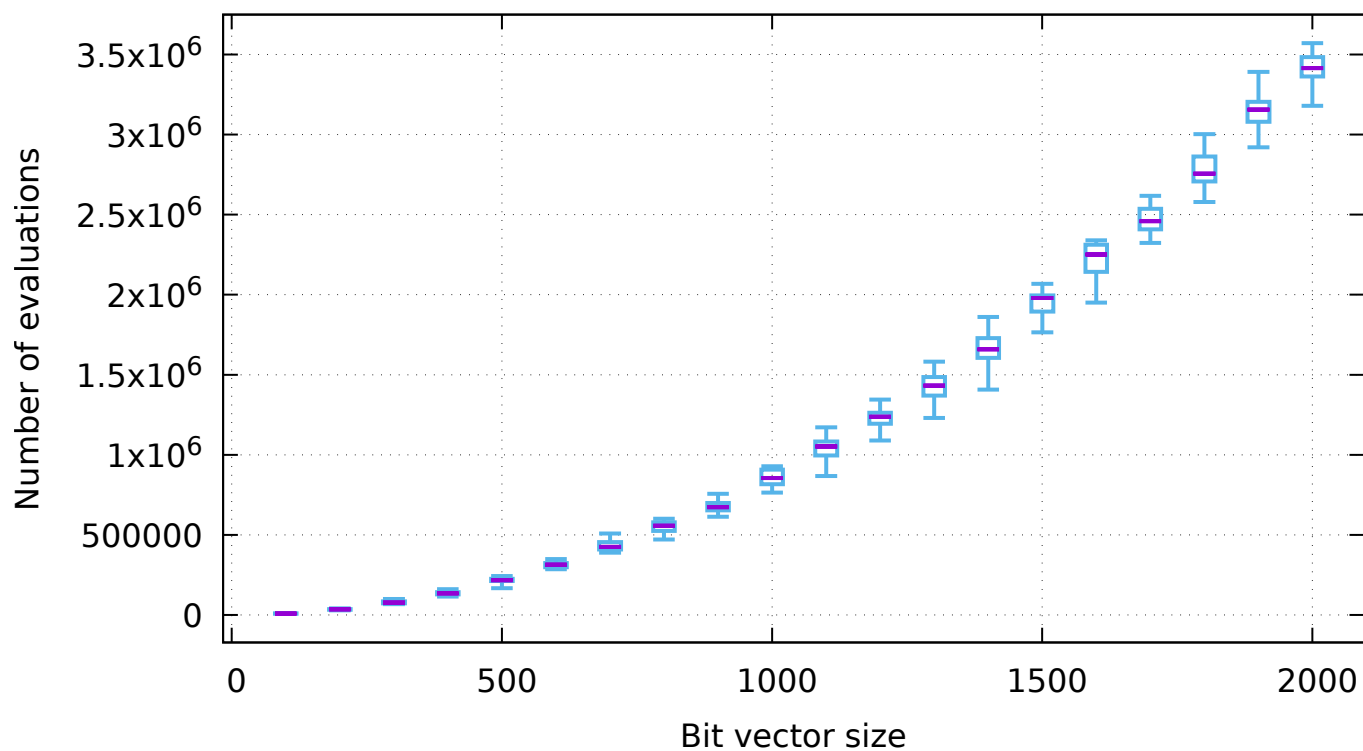
Mean runtime on LeadingOnes



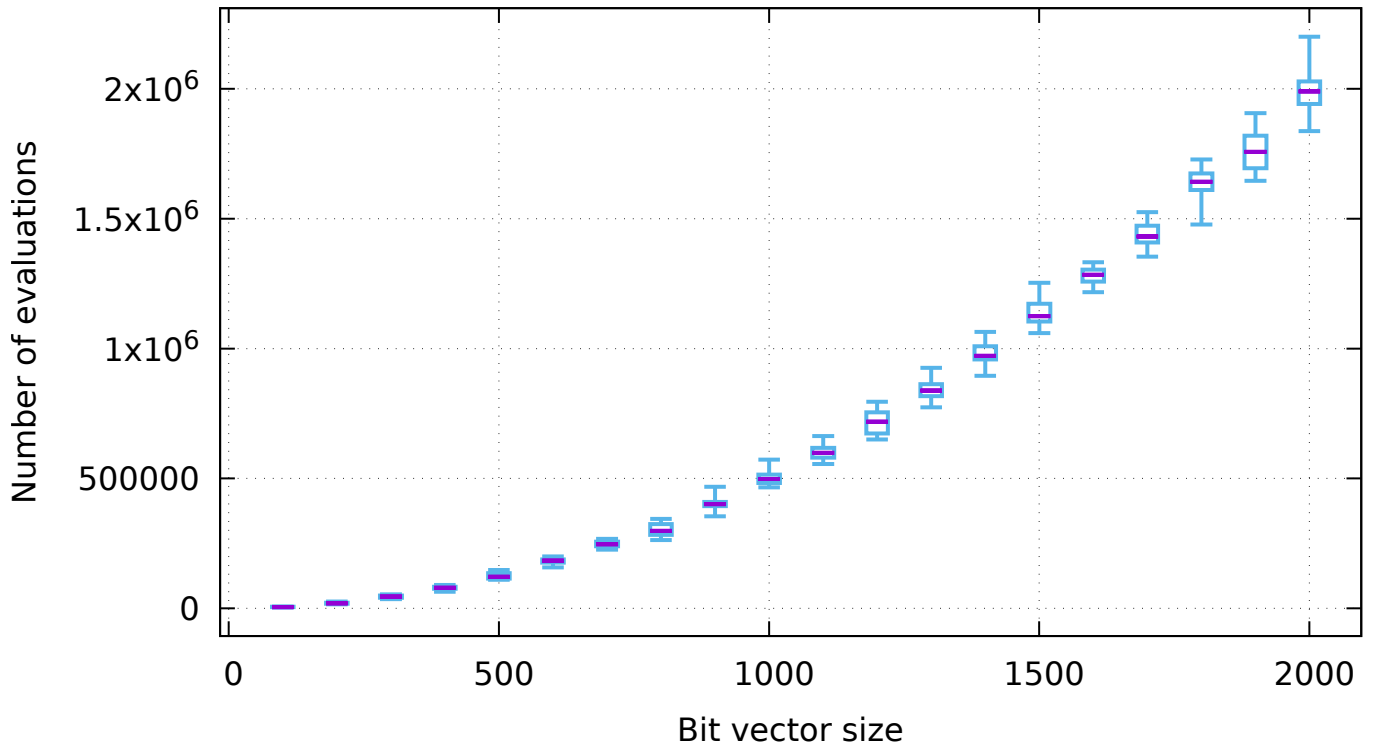
Standard deviation of runtime on LeadingOnes



Runtime of (1+1) EA on LeadingOnes



Runtime of RLS on LeadingOnes



## A Plan

```
{
  "exec": "hnco",
  "opt": "--print-results --stop-on-maximum",
  "budget": 0,
  "num_runs": 20,
  "parallel": true,
  "parameter": {
    "id": "bv-size",
    "label": "Bit vector size",
    "values_perl": "map { 100 + 100 * $_ } (0 .. 19)"
  },
  "graphics": {
    "candlesticks": {
      "boxwidth": 40
    }
  },
  "functions": [
    {
      "id": "one-max",
      "name": "OneMax",
      "opt": "-F 0 --incremental-evaluation",
      "mean_gnuplot": [
        {
          "expression": "f(x) = exp(1) * (x + 1/2) * log(x) - 1.8925417883 * x",
          "title": "Theory (1+1) EA"
        }
      ],
      "stddev_gnuplot": [
        {
          "expression": "f(x) = sqrt(pi**2 / 6 * (exp(1) * x)**2 - (2 * exp(1) + 1) * exp(1) * x * log(x))",
          "title": "Theory (1+1) EA"
        }
      ]
    }
  ]
}
```

```

    }
  ],
},
{
  "id": "leading-ones",
  "name": "LeadingOnes",
  "opt": "-F 10",
  "mean_gnuplot": [
    {
      "expression": "f(x) = (exp(1) - 1) / 2 * x**2",
      "title": "Theory (1+1) EA"
    }
  ],
  "stddev_gnuplot": [
    {
      "expression": "f(x) = sqrt((exp(2) - 1) / 8 * x**3)",
      "title": "Theory (1+1) EA"
    }
  ]
}
],
"algorithms": [
{
  "id": "ea-1p1",
  "name": "(1+1) EA",
  "opt": "-A 300 --allow-no-mutation"
},
{
  "id": "rls",
  "name": "RLS",
  "opt": "-A 100 --rls-patience 0"
}
]
}

```

## 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_precision = 0.01
# fp_upper_bound = 2
# function = 0
# ga_crossover_bias = 0.5
# ga_crossover_probability = 0.5
# ga_tournament_size = 10
# 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
# 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
# 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
# print_defaults
# last_parameter
# exec_name = hnco
# version = 0.19
# Generated from hnco.json
```