Figure 1: timing-pattern

35

30

25

20

15

10

5

0

time (s)

0   2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

0-univ-count

○ abstract-real
— $1.11 \cdot 10^{-7} \cdot x^2 + 3.83 \cdot 10^{-4} \cdot x$
* close-abstract-re
— $1.1 \cdot 10^{-7} \cdot x^2 + 3.06 \cdot 10^{-4} \cdot x$
⊗ exact-real
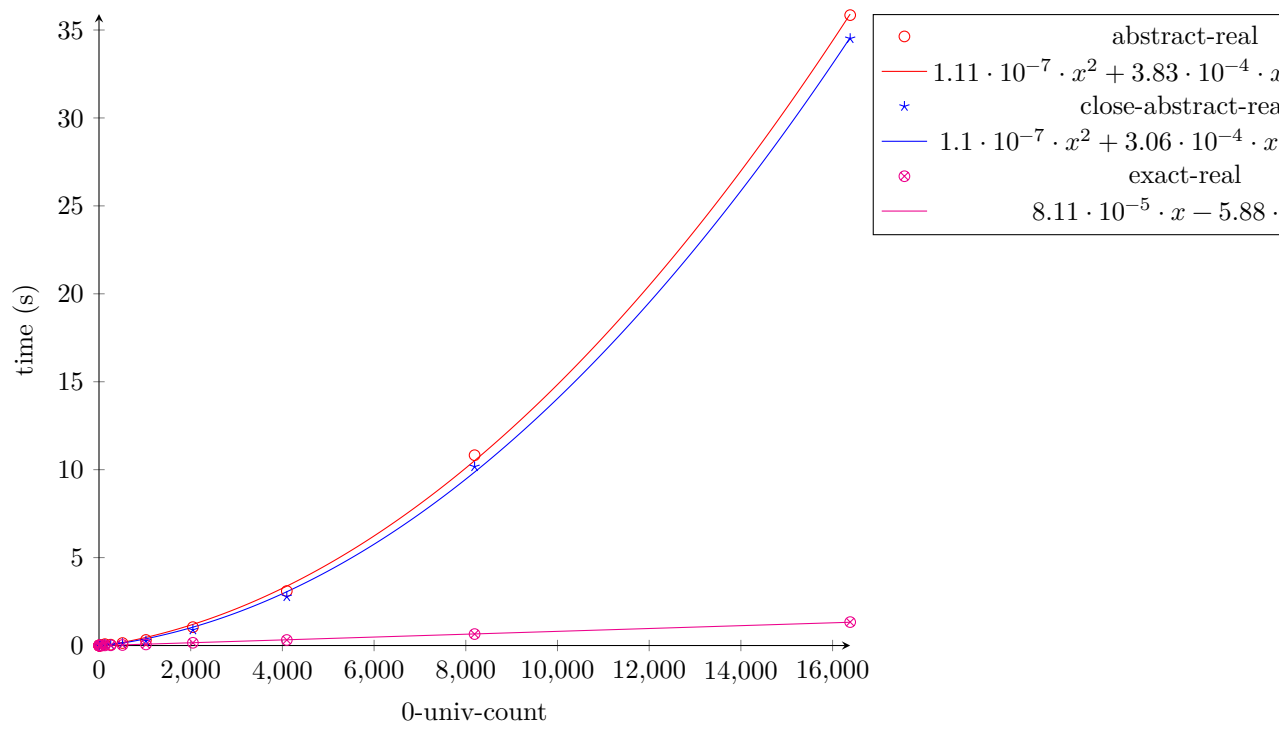— $8.11 \cdot 10^{-5} \cdot x - 5.88 \cdot$

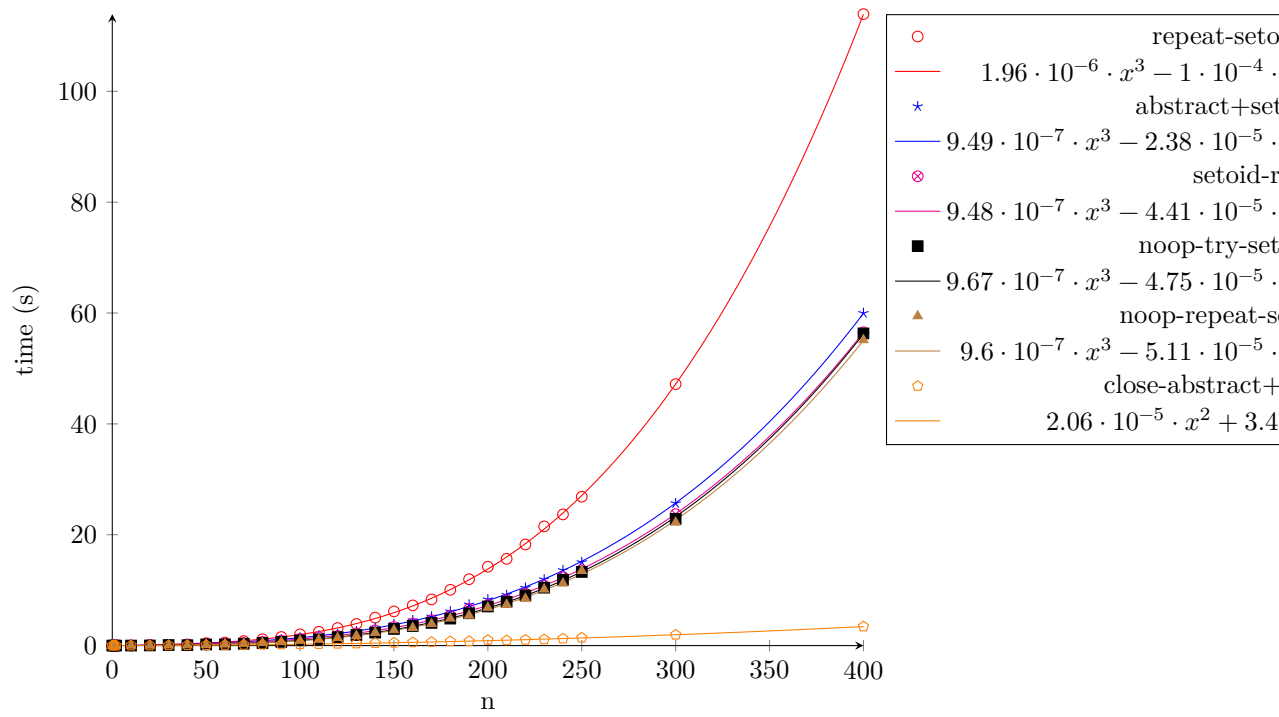Figure 2: timing-n-polymorphic-universes param-1-n 0

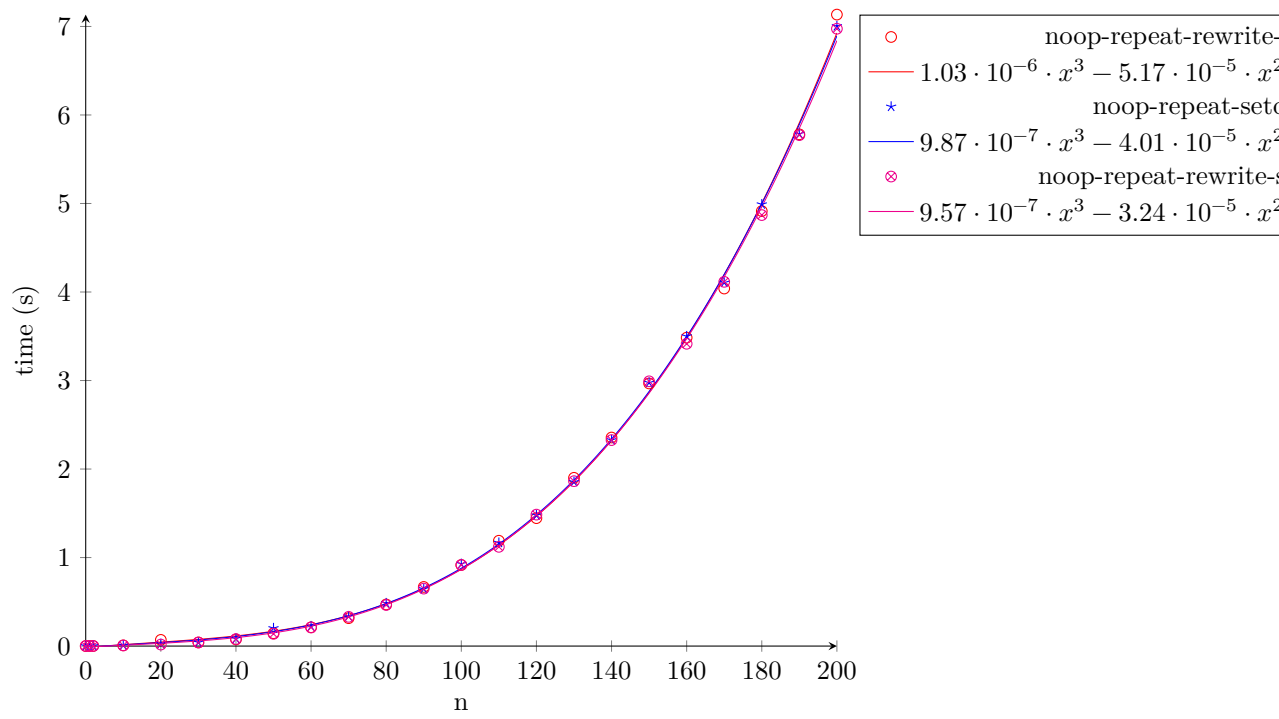Figure 3: timing-repeat-setoid-rewrite-under-binders

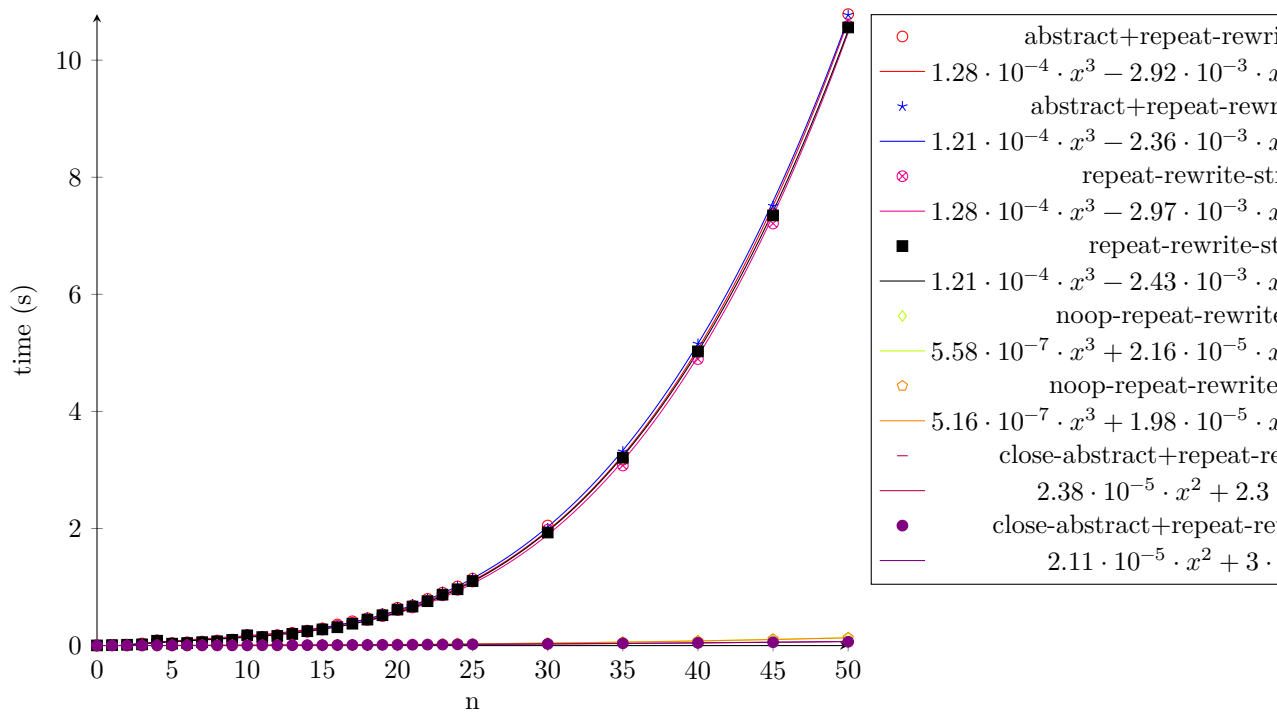Figure 4: timing-repeat-setoid-rewrite-under-binders-noop
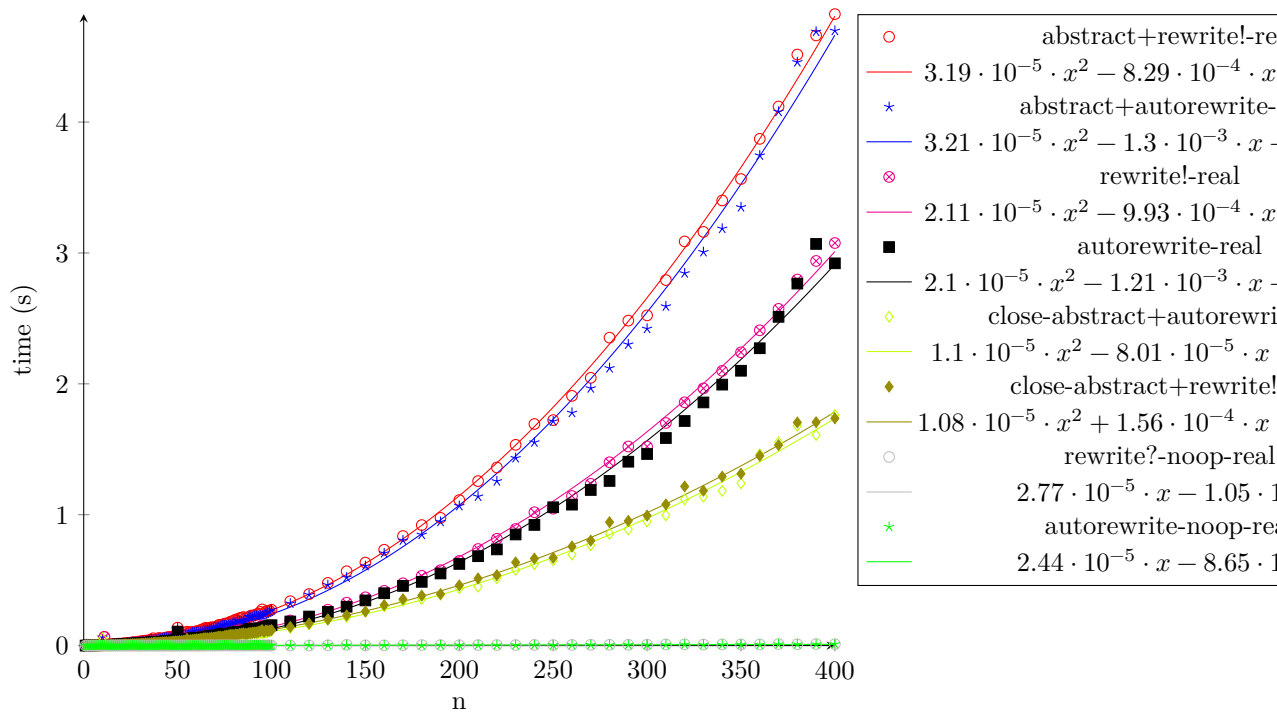
Figure 5: timing-rewrite-strat-under-binders

Figure 6: timing-rewrite-repeated-app-autorewrite
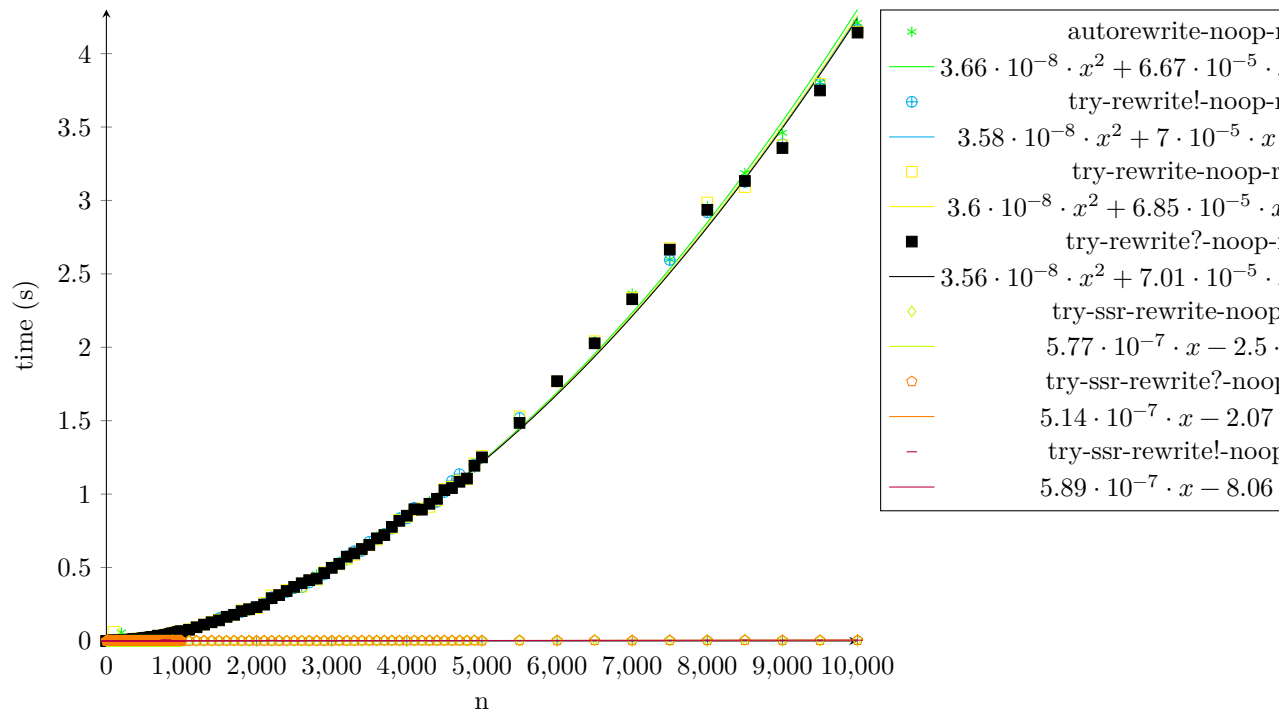
Figure 7: timing-rewrite-repeated-app-autorewrite-noop

The plot contains the following legend entries:

- autorewrite-noop-r
- $3.66 \cdot 10^{-8} \cdot x^2 + 6.67 \cdot 10^{-5} \cdot x$
- try-rewrite!-noop-r
- $3.58 \cdot 10^{-8} \cdot x^2 + 7 \cdot 10^{-5} \cdot x$
- try-rewrite-noop-r
- $3.6 \cdot 10^{-8} \cdot x^2 + 6.85 \cdot 10^{-5} \cdot x$
- try-rewrite?-noop-r
- $3.56 \cdot 10^{-8} \cdot x^2 + 7.01 \cdot 10^{-5} \cdot x$
- try-ssr-rewrite-noop
- $5.77 \cdot 10^{-7} \cdot x - 2.5$
- try-ssr-rewrite?-noop
- $5.14 \cdot 10^{-7} \cdot x - 2.07$
- try-ssr-rewrite!-noop
- $5.89 \cdot 10^{-7} \cdot x - 8.06$
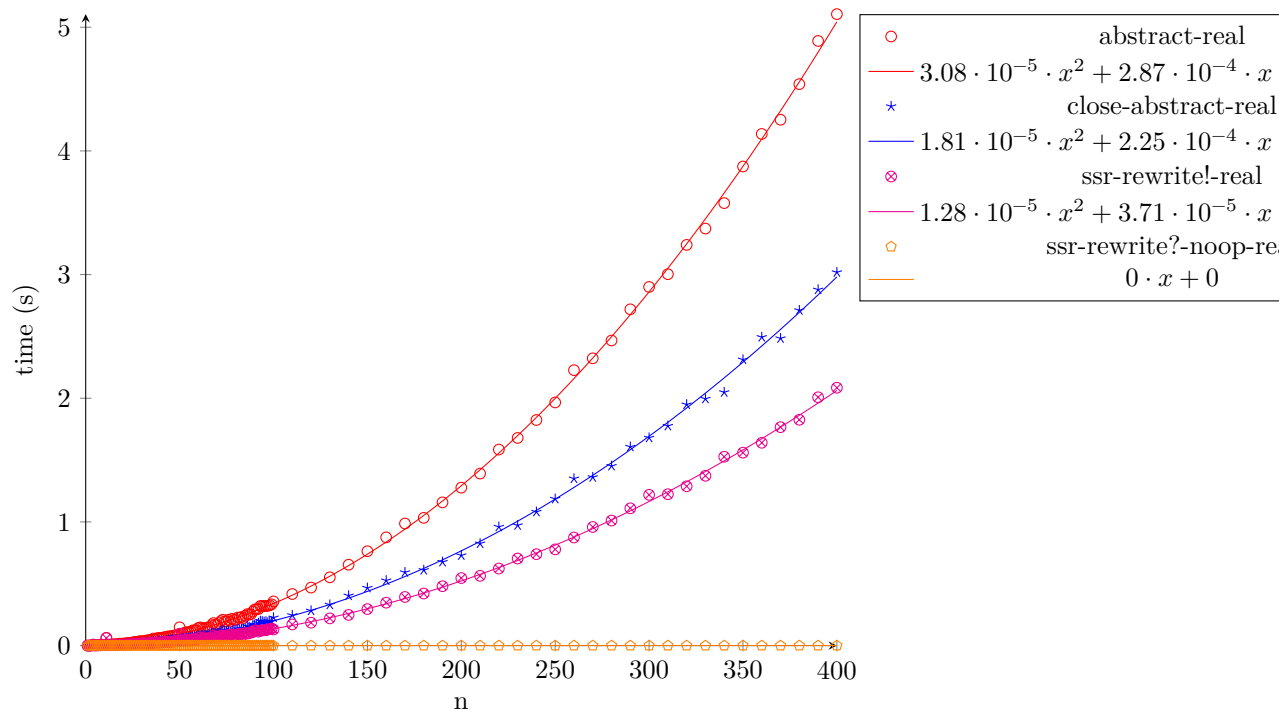
Figure 8: timing-rewrite-repeated-app-ssrrewrite
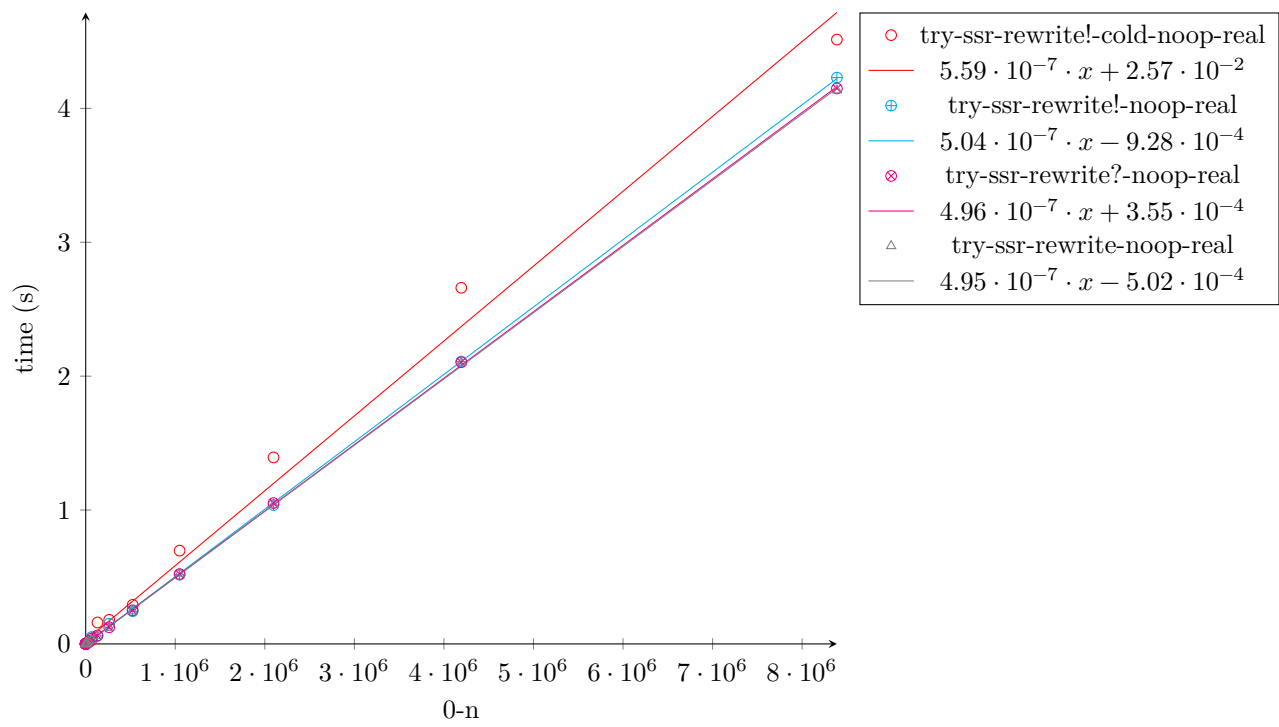
Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1
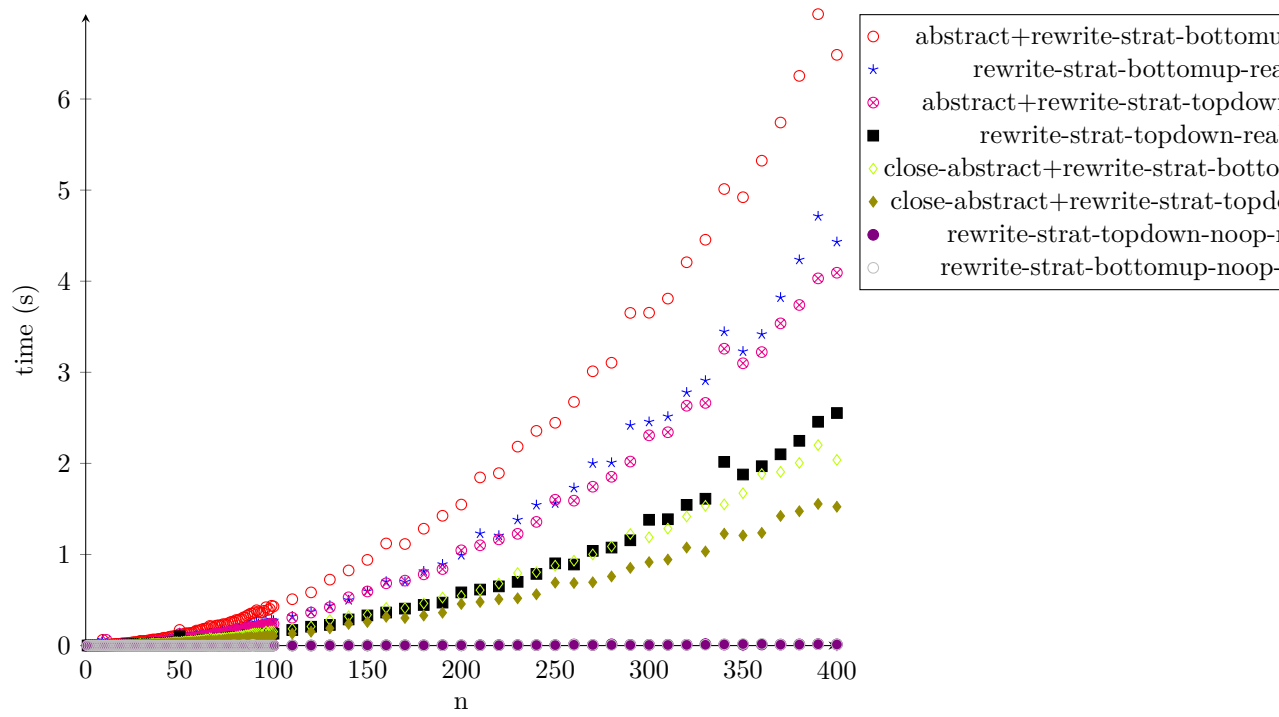
Figure 10: timing-rewrite-repeated-app-rewrite-strat

The chart legend entries:
- abstract+rewrite-strat-bottomu...
- rewrite-strat-bottomup-rea...
- abstract+rewrite-strat-topdow...
- rewrite-strat-topdown-rea...
- close-abstract+rewrite-strat-botto...
- close-abstract+rewrite-strat-topd...
- rewrite-strat-topdown-noop-...
- rewrite-strat-bottomup-noop-...

Axis labels: time (s) on vertical axis, n on horizontal axis.
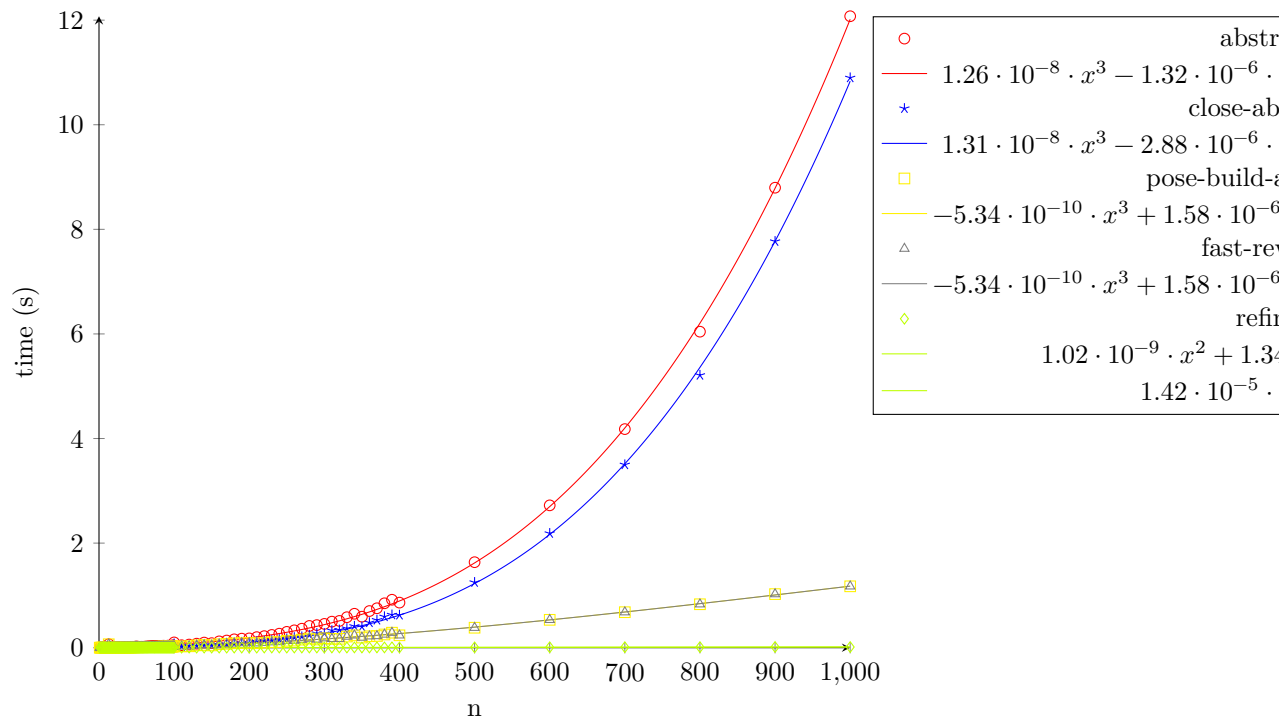
Figure 11: timing-rewrite-repeated-app-fast-rewrite

time (s)

25

20

15

10

5

0

0   500   1,000   1,500   2,000   2,500   3,000   3,500   4,000   4,500   5,000

n

pose-build-

$-8.52 \cdot 10^{-12} \cdot x^3 + 1.03 \cdot 10^{-6}$

fast-re

$-8.52 \cdot 10^{-12} \cdot x^3 + 1.03 \cdot 10^{-6}$

refi

$9.51 \cdot 10^{-10} \cdot x^2 + 1.$

$1.8 \cdot 10^{-5} \cdot$
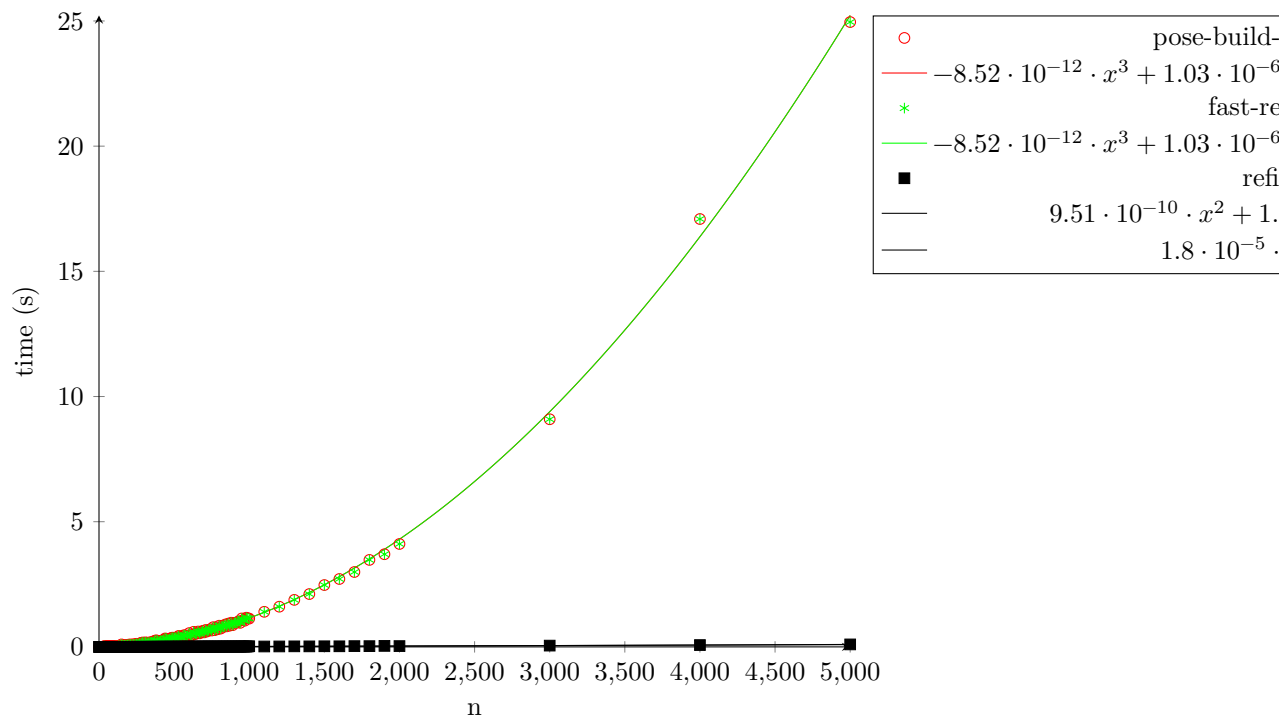
Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract
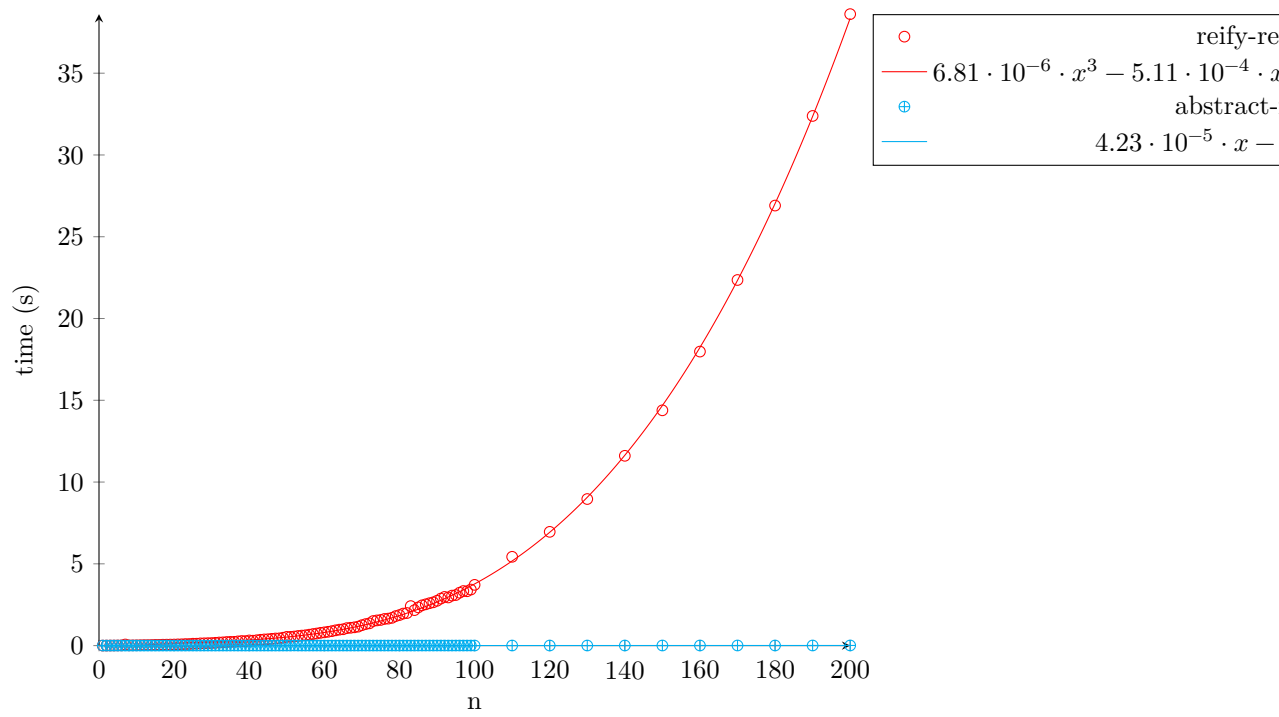
Figure 13: timing-typeclass-reification-let-in-HOAS
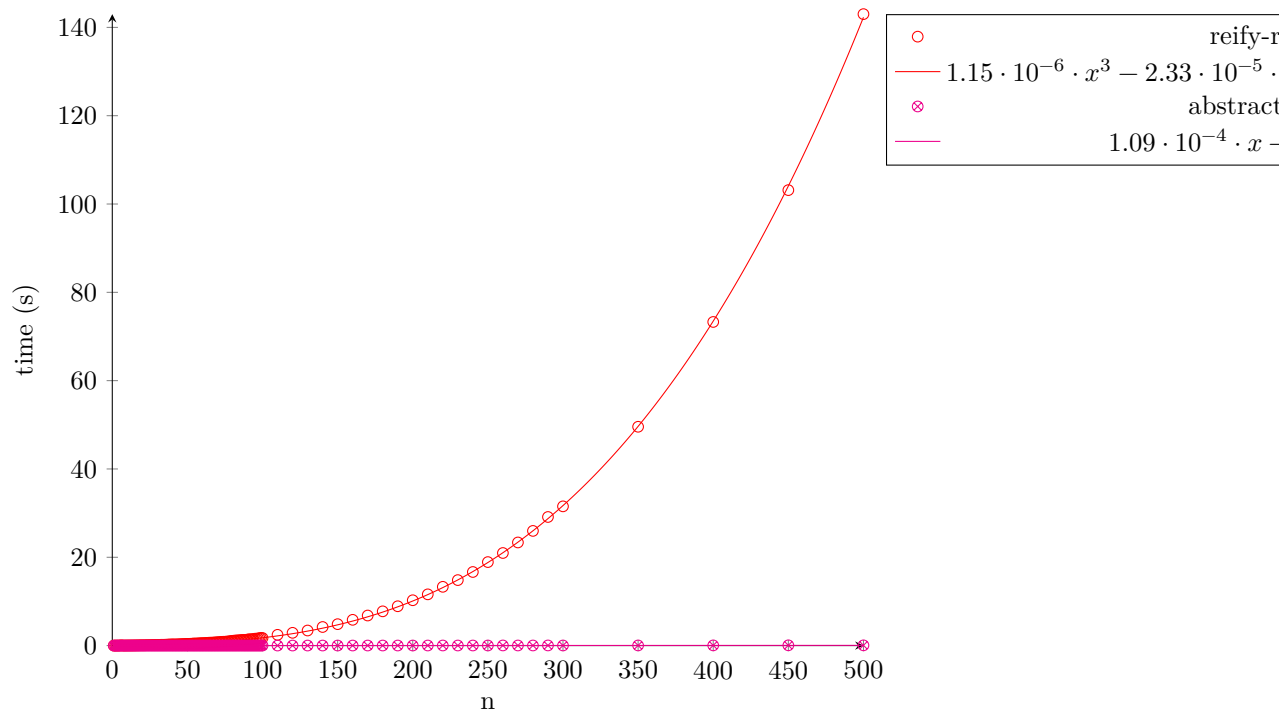
Figure 14: timing-typeclass-reification-let-in-PHOAS

time (s)

16

14

12

10

8

6

4

2

0

0   2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

0-nm

○ rewrite-strat(bottomup-bot

$6.83 \cdot 10^{-3} \, exp \, (0.46 \cdot ($

⋆ rewrite-strat(topdown-bott

$7.17 \cdot 10^{-3} \, exp \, (0.46 \cdot ($

⊗ cps+cbn-real

$8.21 \cdot 10^{-6} \cdot x^2 - 1.71 \cdot 10^{-4} \cdot$

◇ cps+native-compute

$8.52 \cdot 10^{-11} \cdot x^2 + 5.93 \cdot 10^{-6} \cdot$

– cps+lazy-real

$2.6 \cdot 10^{-10} \cdot x^2 + 4.5 \cdot 10^{-6} \cdot x$

● cps+cbv-real

$1.27 \cdot 10^{-10} \cdot x^2 + 3.59 \cdot 10^{-6} \cdot$

⊕ cps+vm-compute-

$2.16 \cdot 10^{-10} \cdot x^2 + 6.14 \cdot 10^{-6} \cdot$

■ cps+simpl-real

$1.08 \cdot 10^{-6} \cdot x^2 + 4 \cdot 10^{-4} \cdot x$

◇ setoid-rewrite-rea

$-8.31 \cdot 10^{-3} \cdot x^3 + 0.27 \cdot x^2 -$
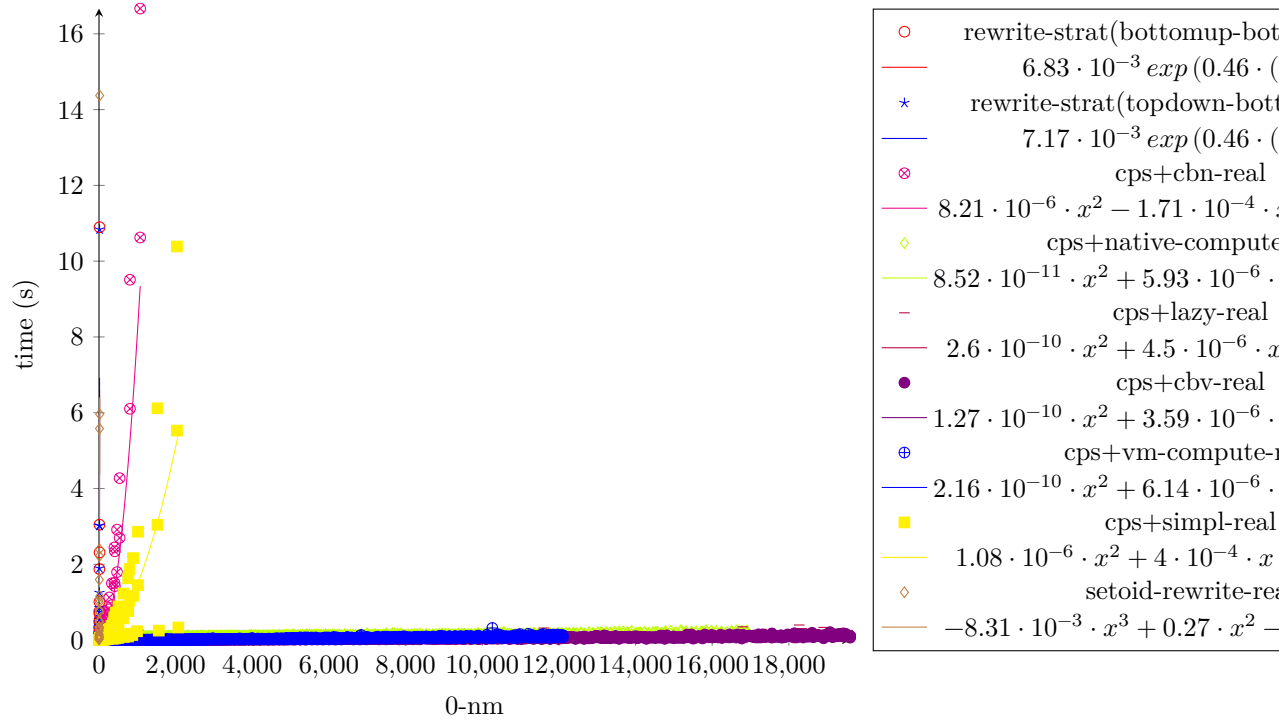
Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1
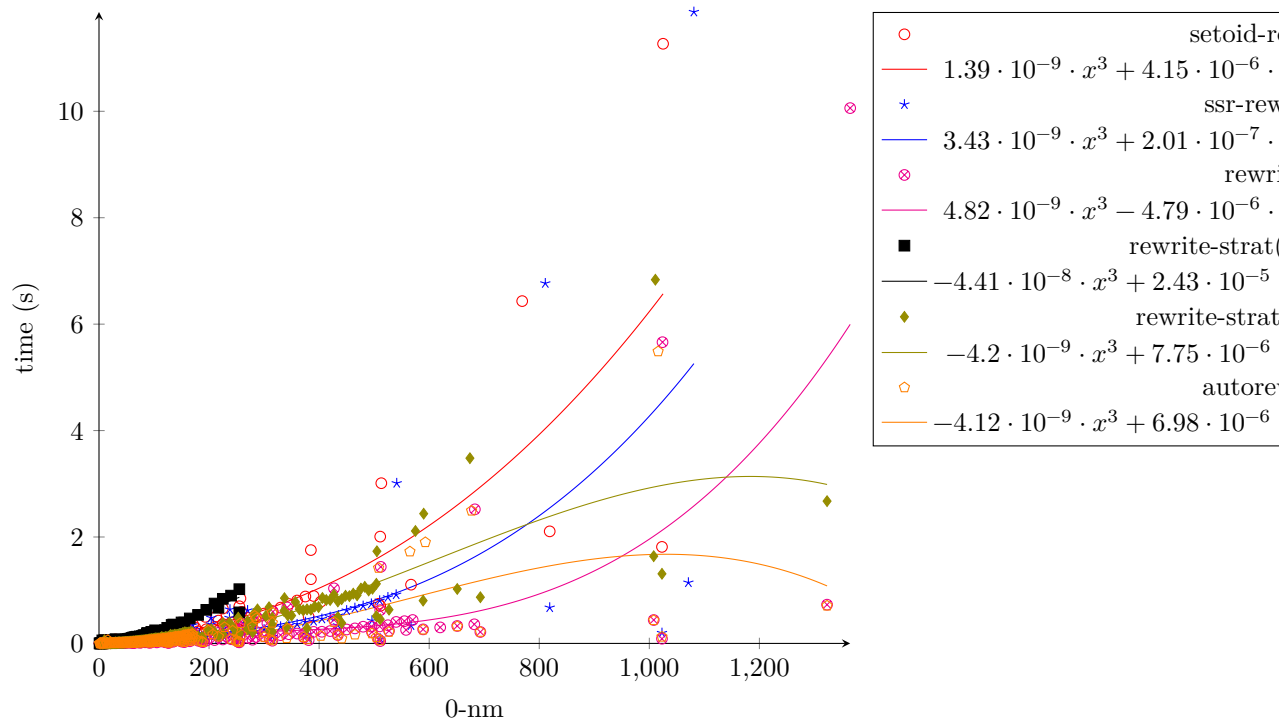
15

Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1
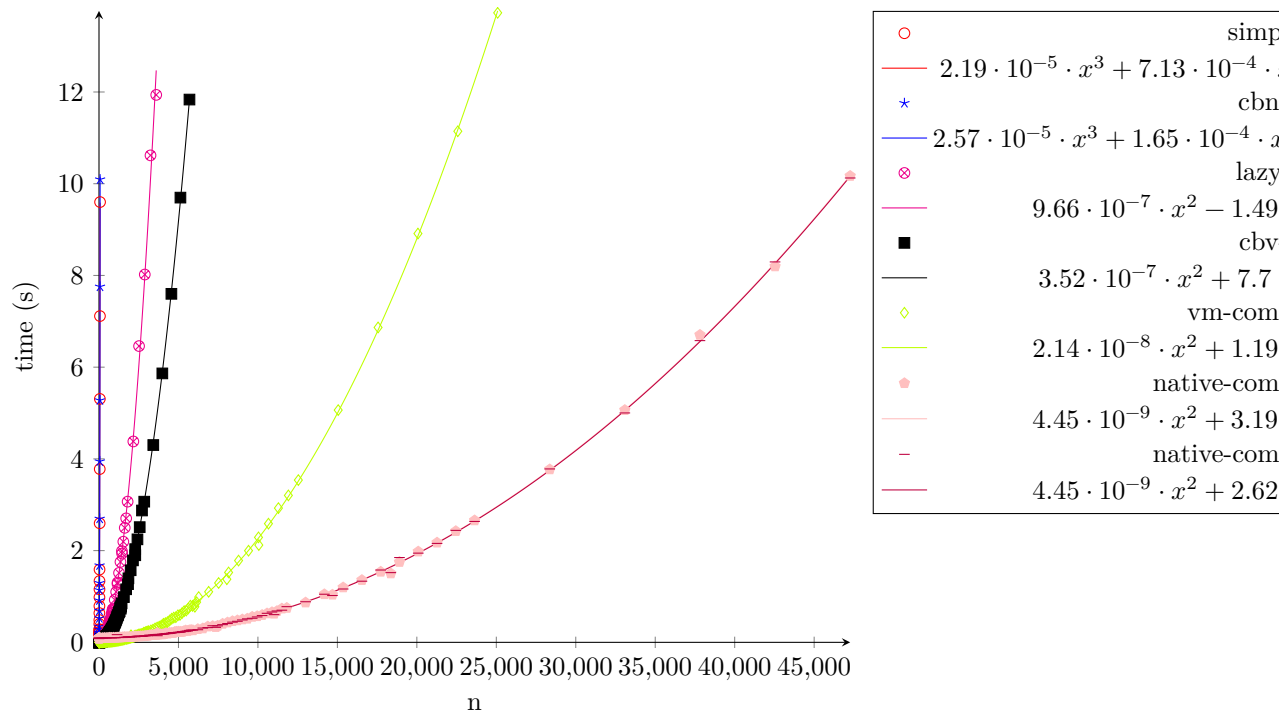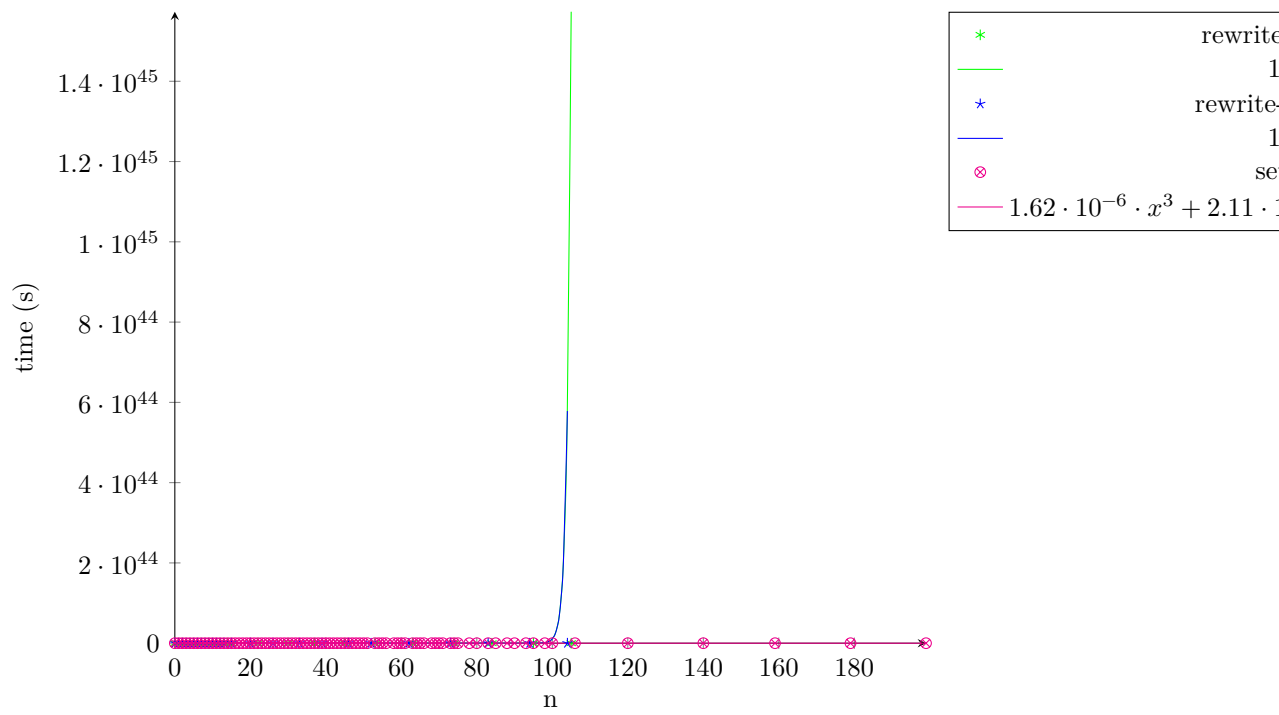
Figure 17: timing-sieve-of-eratosthenes

Figure 18: timing-rewrite-under-lets-plus-0

Legend entries:

- abstract-real
  $2.3 \cdot 10^{-6} \cdot x^2 + 3.17 \cdot 10^{-4} \cdot x$
- fast-rewrite-real
  $1.89 \cdot 10^{-6} \cdot x^2 + 2.63 \cdot 10^{-4} \cdot x$
- close-abstract-rea...
  $4.11 \cdot 10^{-7} \cdot x^2 + 4.99 \cdot 10^{-5} \cdot x$
- check-admit-real
  $2.82 \cdot 10^{-7} \cdot x^2 - 1.08 \cdot 10^{-5} \cdot x$
- type-admit-cast-re...
  $2.85 \cdot 10^{-7} \cdot x^2 - 2.73 \cdot 10^{-6} \cdot x$
- refine-real
  $2.41 \cdot 10^{-7} \cdot x^2 + 1.37 \cdot 10^{-5} \cdot x$
  $5.13 \cdot 10^{-4} \cdot x - 5.33 \cdot$
- type-pf-cast-real
  $2.71 \cdot 10^{-7} \cdot x^2 + 1.57 \cdot 10^{-5} \cdot x$
- check-pf-cast-rea...
  $2.67 \cdot 10^{-7} \cdot x^2 + 1.98 \cdot 10^{-5} \cdot x$
- check-admit-cast-re...
  $2.74 \cdot 10^{-7} \cdot x^2 + 4.28 \cdot 10^{-6} \cdot x$
- type-admit-real
  $2.67 \cdot 10^{-7} \cdot x^2 + 2.42 \cdot 10^{-5} \cdot x$
- build-eval-thunk-re...
  $1.2 \cdot 10^{-4} \cdot x - 4.99 \cdot$
- build-thunk-real
  $1.18 \cdot 10^{-4} \cdot x - 5.04 \cdot$
- check-I-real
  $2.38 \cdot 10^{-5} \cdot x - 4.47 \cdot$
- type-I-real
  $2.26 \cdot 10^{-5} \cdot x - 5.88 \cdot$
- build-I-real
  $1.11 \cdot 10^{-5} \cdot x - 5.21 \cdot$
- build-pf-cast-real
  $1.03 \cdot 10^{-5} \cdot x - 5.81 \cdot$
- build-admit-real
  $1.02 \cdot 10^{-5} \cdot x - 4.36 \cdot$
- build-admit-cast-re...
  $1.01 \cdot 10^{-5} \cdot x - 4.53 \cdot$
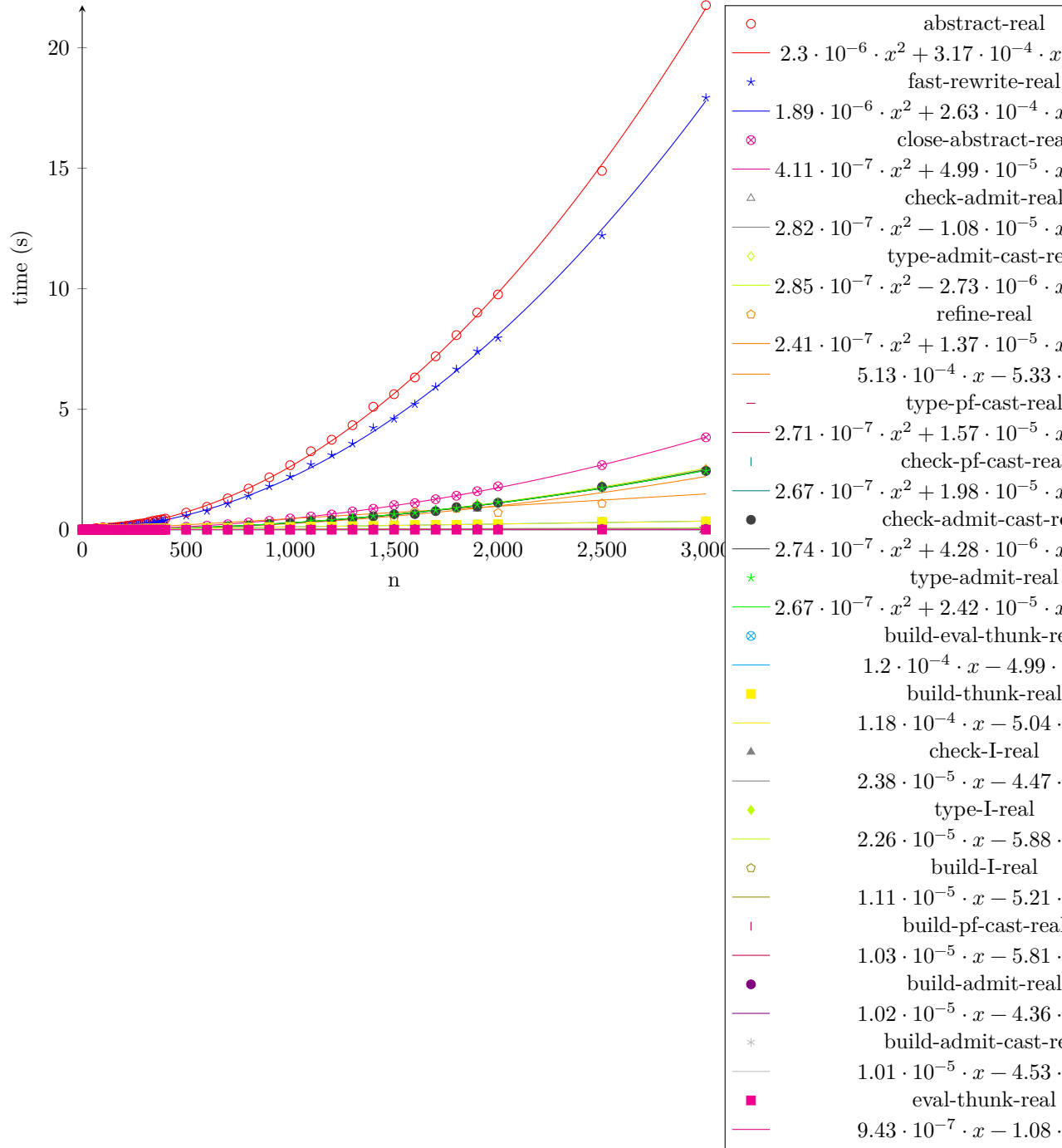- eval-thunk-real
  $9.43 \cdot 10^{-7} \cdot x - 1.08 \cdot$

Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2