Figure 1: timing-pattern

1

time (s)

25

20

15

10

5

0

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

0-univ-count

○   abstract-real

$8.89 \cdot 10^{-8} \cdot x^2 + 3.22 \cdot 10^{-4} \cdot x$

∗   abstract-user

$8.92 \cdot 10^{-8} \cdot x^2 + 3.14 \cdot 10^{-4} \cdot x$

⋆   close-abstract-real

$8.88 \cdot 10^{-8} \cdot x^2 + 2.6 \cdot 10^{-4} \cdot x$

⊕   close-abstract-user

$8.88 \cdot 10^{-8} \cdot x^2 + 2.57 \cdot 10^{-4} \cdot x$

⊗   exact-real

$6.46 \cdot 10^{-5} \cdot x - 4.34$

□   exact-user

$6.34 \cdot 10^{-5} \cdot x - 5.01$

■   abstract-sys
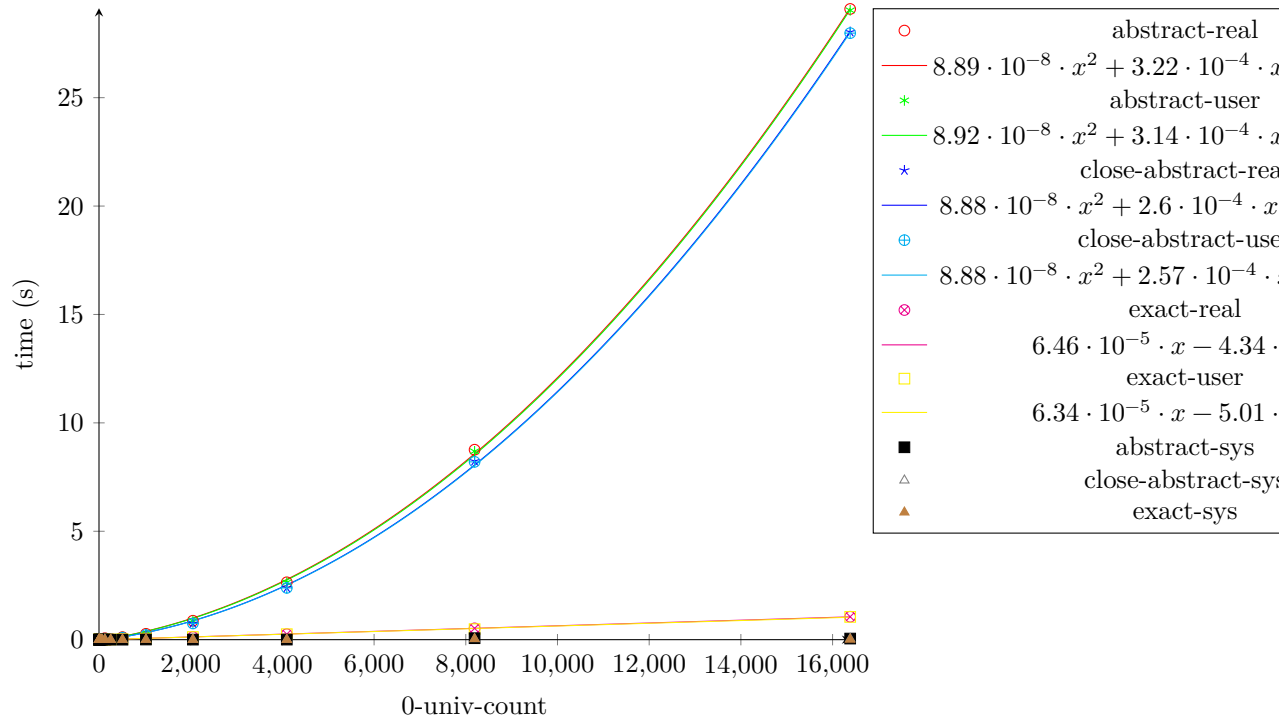
△   close-abstract-sys
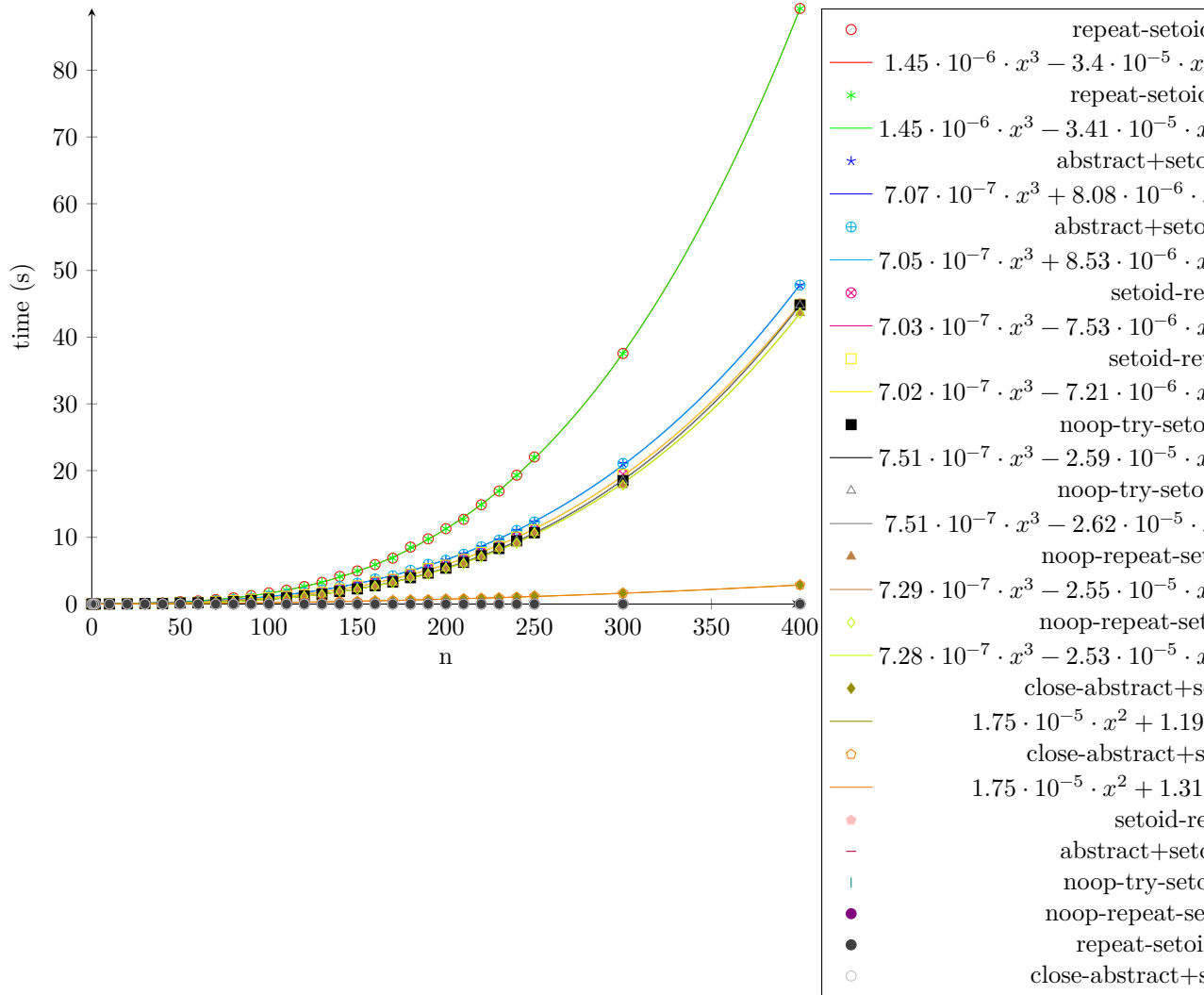
▲   exact-sys

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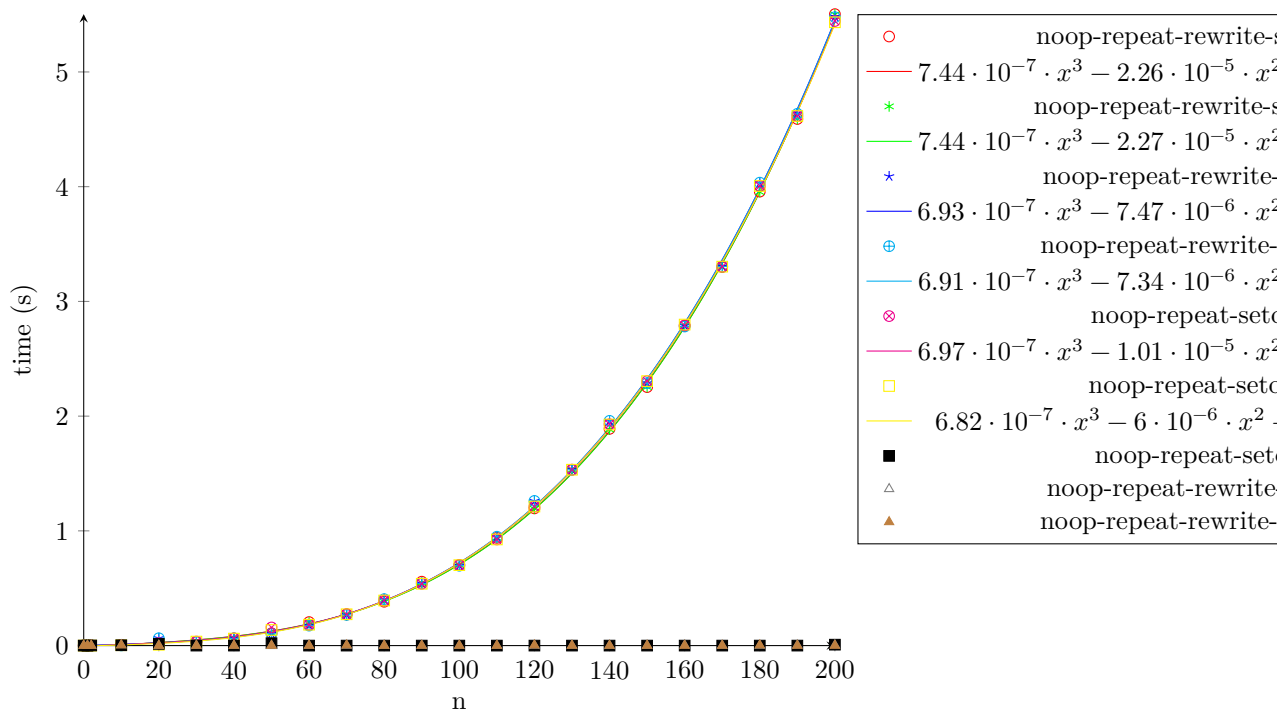
2

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

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

The figure contains a plot with the following legend entries:

- $\circ$ (red) noop-repeat-rewrite-s
- $7.44 \cdot 10^{-7} \cdot x^3 - 2.26 \cdot 10^{-5} \cdot x^2$
- $*$ (green) noop-repeat-rewrite-s
- $7.44 \cdot 10^{-7} \cdot x^3 - 2.27 \cdot 10^{-5} \cdot x^2$
- $\star$ (blue) noop-repeat-rewrite-
- $6.93 \cdot 10^{-7} \cdot x^3 - 7.47 \cdot 10^{-6} \cdot x^2$
- $\oplus$ (cyan) noop-repeat-rewrite-
- $6.91 \cdot 10^{-7} \cdot x^3 - 7.34 \cdot 10^{-6} \cdot x^2$
- $\otimes$ (magenta) noop-repeat-setc
- $6.97 \cdot 10^{-7} \cdot x^3 - 1.01 \cdot 10^{-5} \cdot x^2$
- $\square$ (yellow) noop-repeat-setc
- $6.82 \cdot 10^{-7} \cdot x^3 - 6 \cdot 10^{-6} \cdot x^2$
- $\blacksquare$ (black) noop-repeat-setc
- $\triangle$ noop-repeat-rewrite-
- $\blacktriangle$ noop-repeat-rewrite-

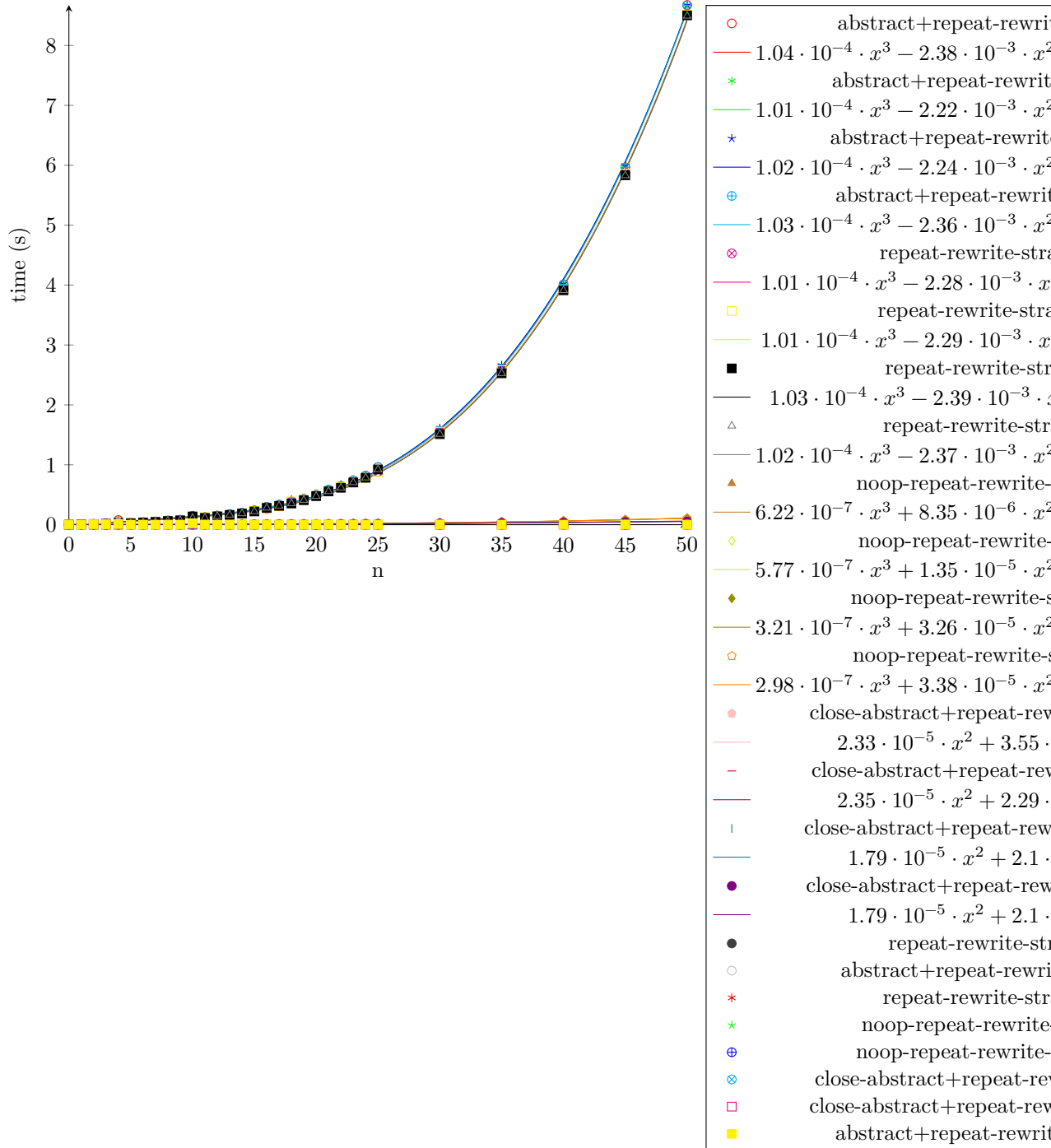The x-axis is labeled n and the y-axis is labeled time (s).

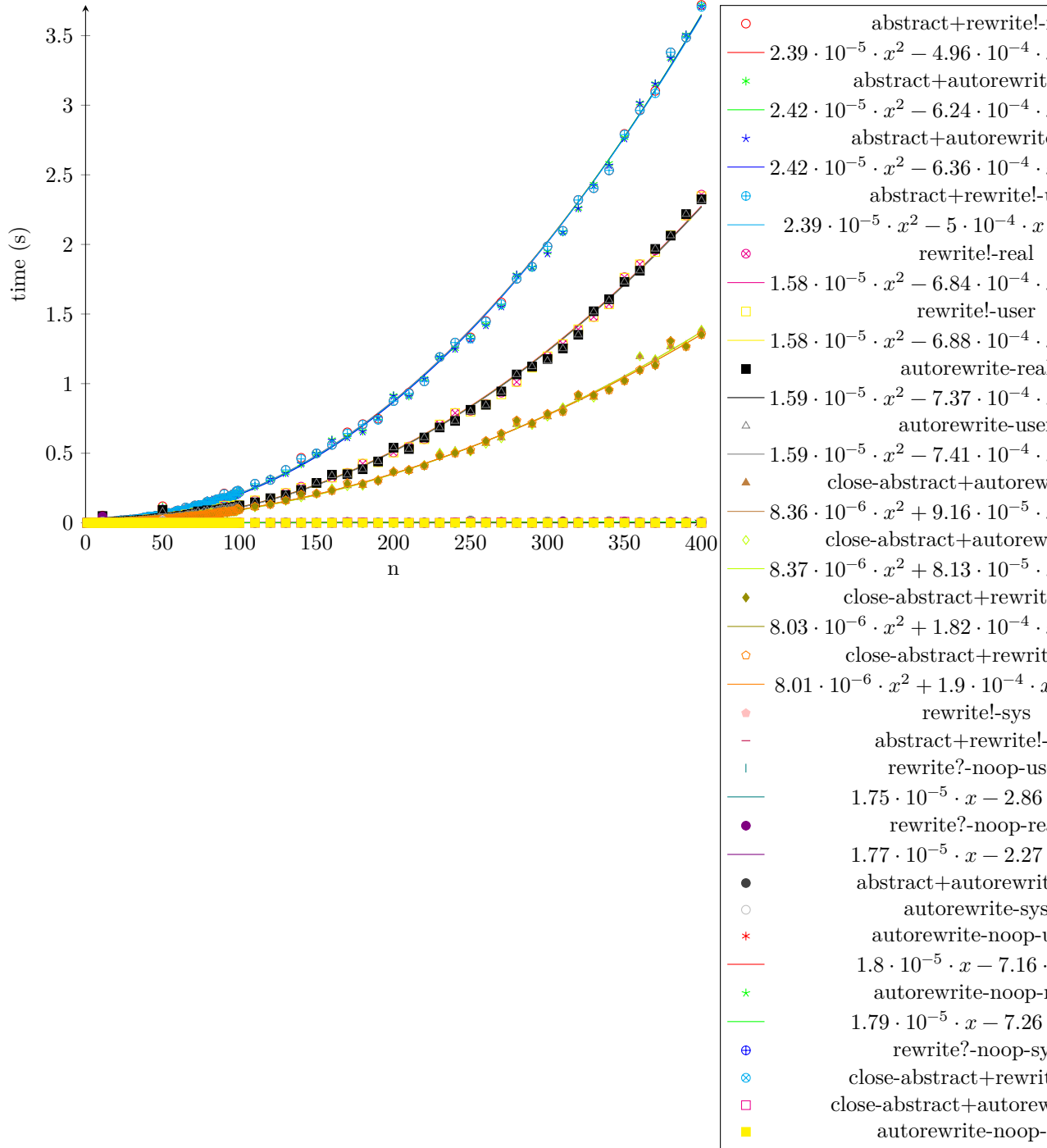Figure 5: timing-rewrite-strat-under-binders

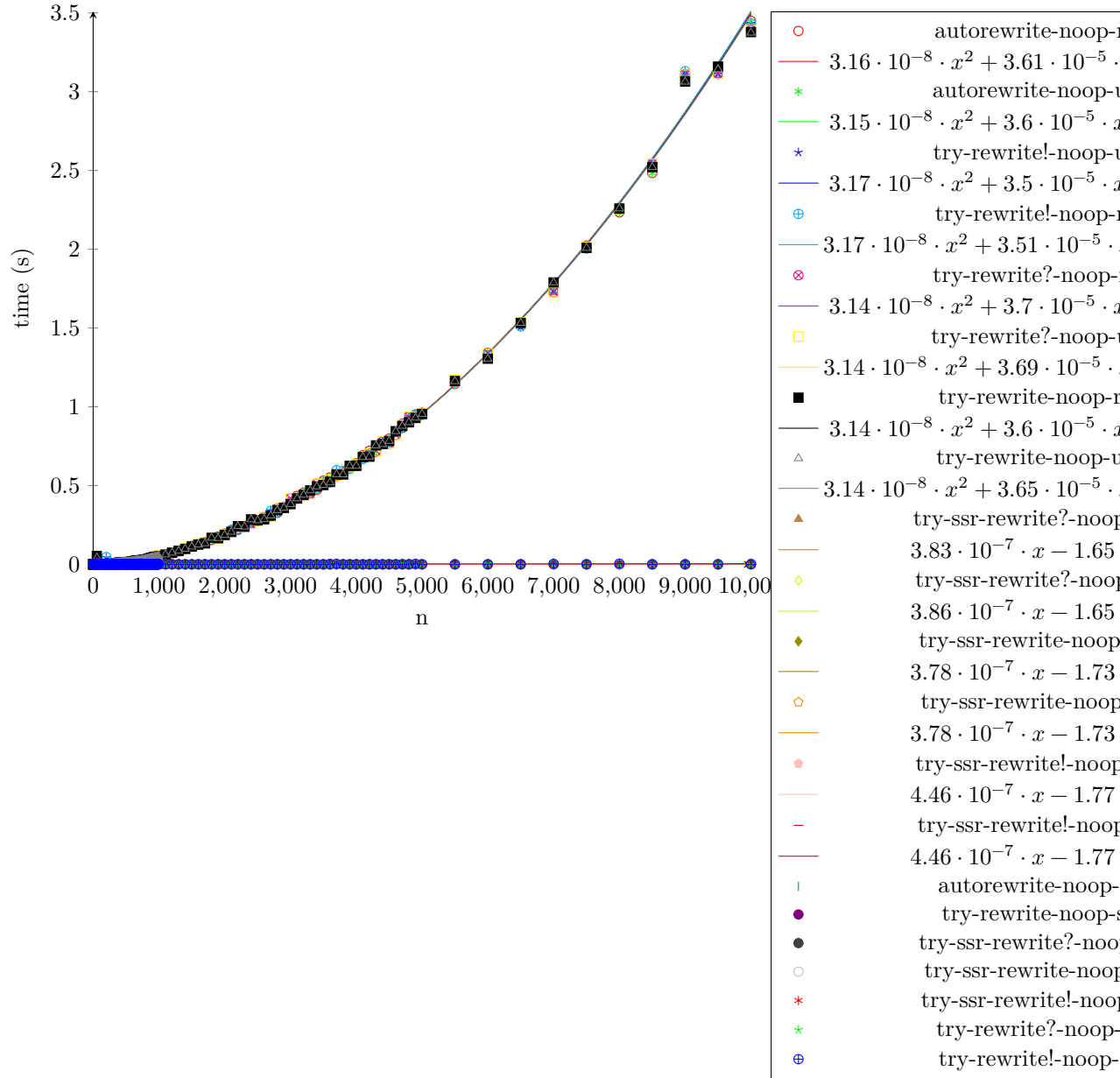Figure 6: timing-rewrite-repeated-app-autorewrite

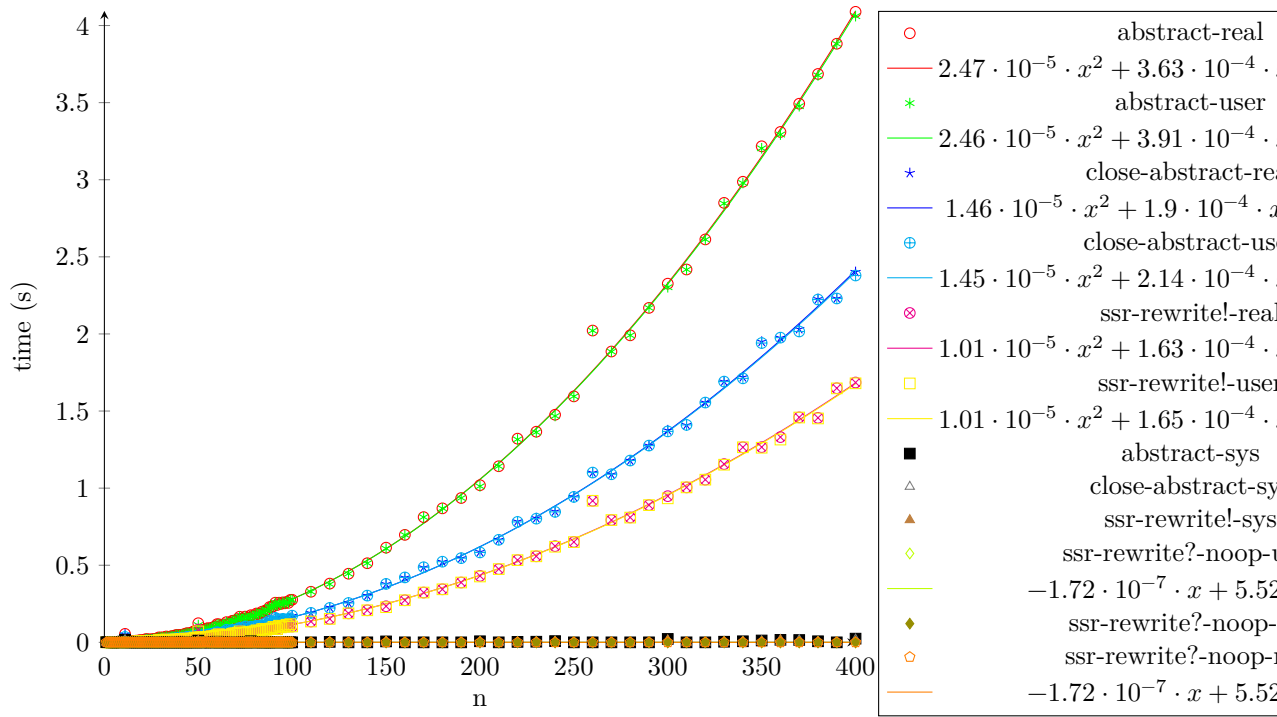Figure 7: timing-rewrite-repeated-app-autorewrite-noop

Figure 8: timing-rewrite-repeated-app-ssrrewrite
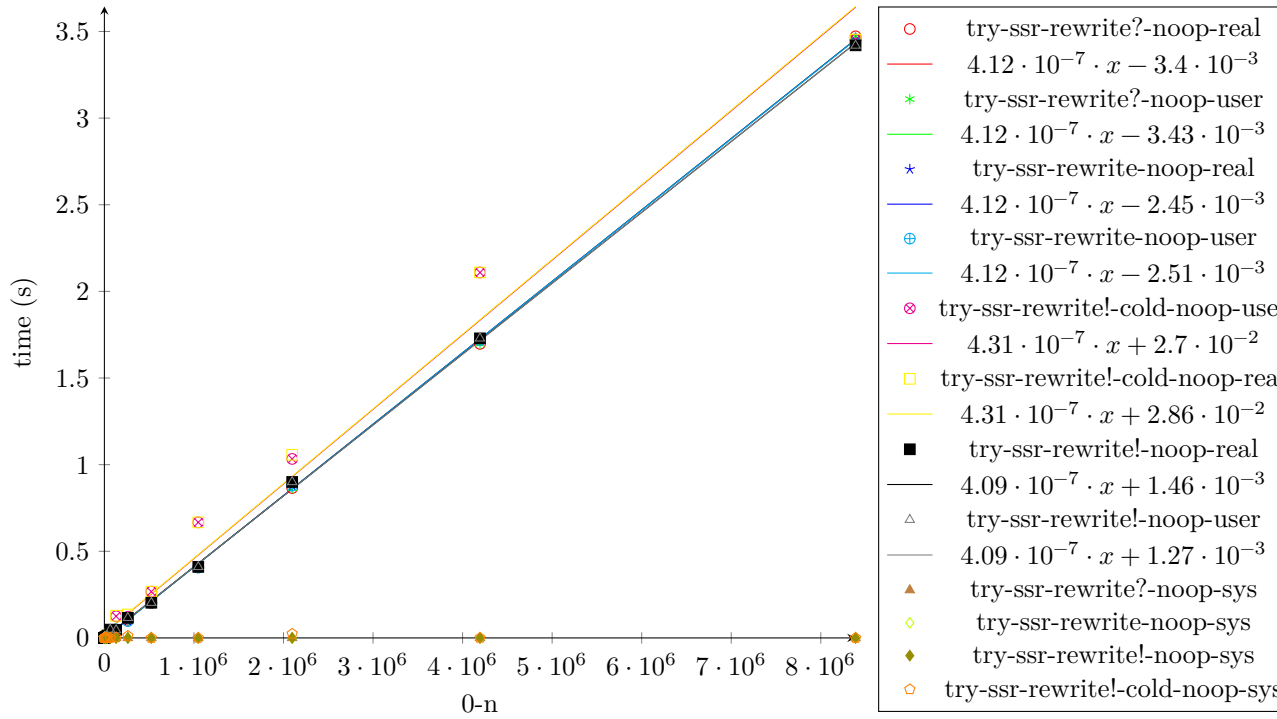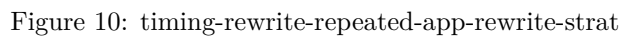
8

Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

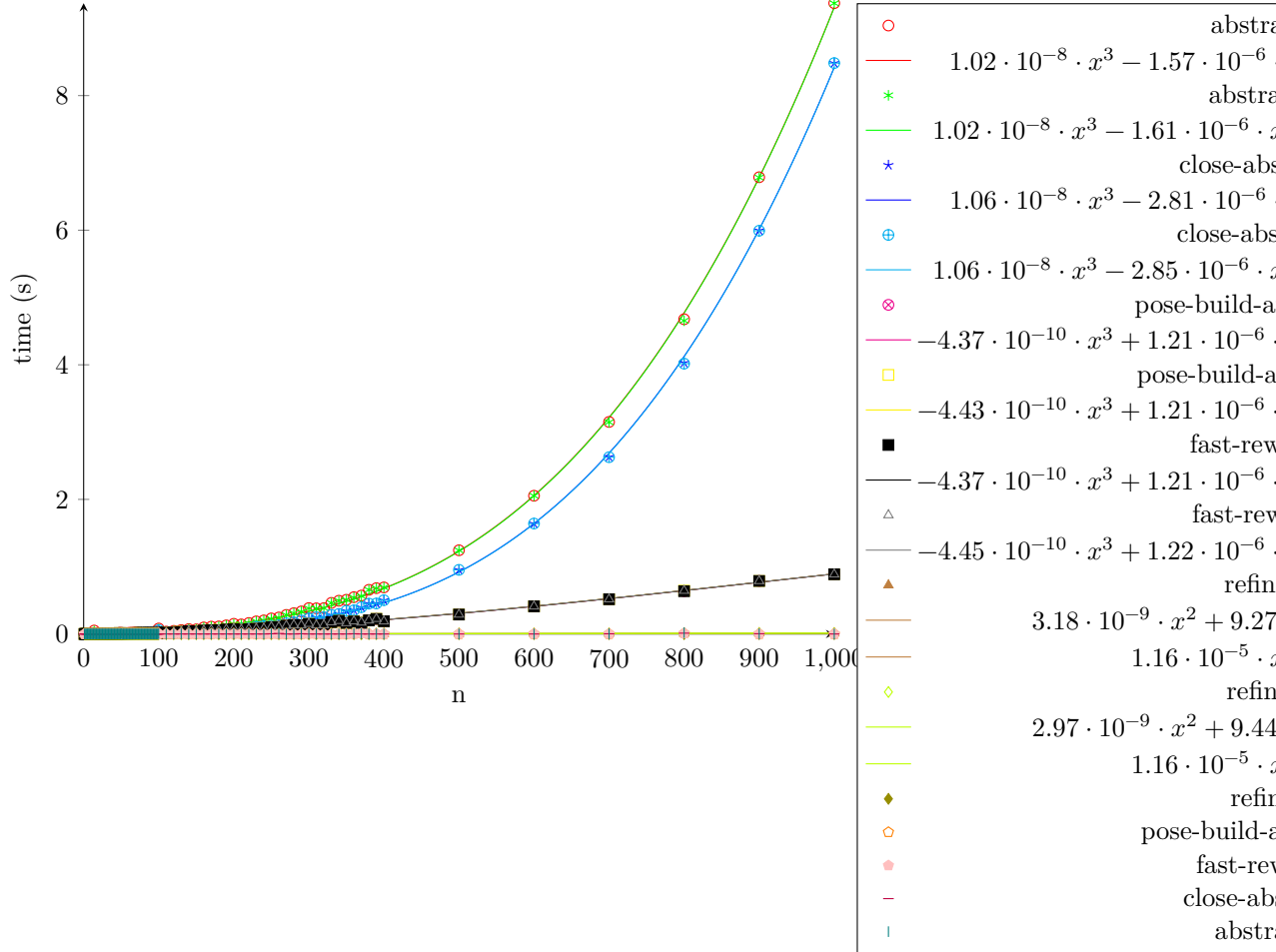Figure 10: timing-rewrite-repeated-app-rewrite-strat
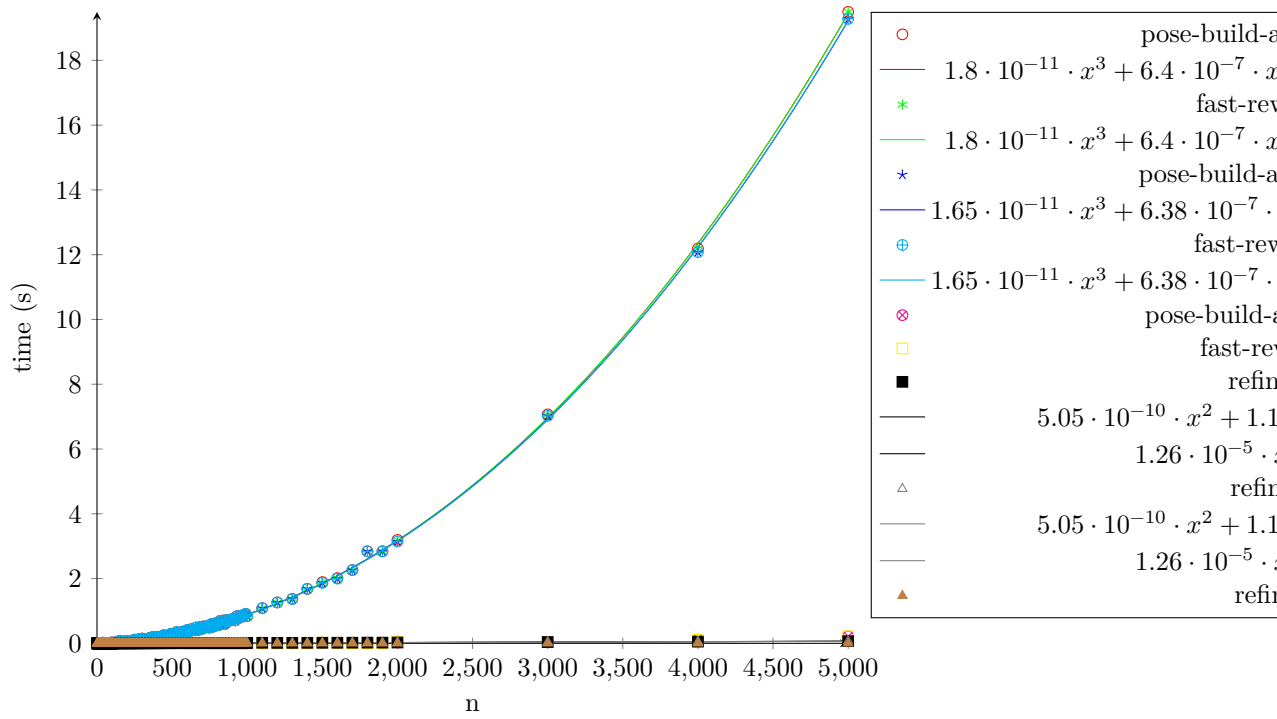
Figure 11: timing-rewrite-repeated-app-fast-rewrite

Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract

time (s)

n

○	abstract-real
	$1.9 \cdot 10^{-6} \cdot x^2 + 1.9 \cdot 10^{-4} \cdot x$
*	abstract-user
	$1.9 \cdot 10^{-6} \cdot x^2 + 1.89 \cdot 10^{-4} \cdot x$
*	fast-rewrite-real
	$1.59 \cdot 10^{-6} \cdot x^2 + 1.54 \cdot 10^{-4} \cdot x$
⊕	fast-rewrite-user
	$1.58 \cdot 10^{-6} \cdot x^2 + 1.53 \cdot 10^{-4} \cdot x$
⊗	close-abstract-user
	$3.11 \cdot 10^{-7} \cdot x^2 + 3.47 \cdot 10^{-5} \cdot x$
□	close-abstract-real
	$3.11 \cdot 10^{-7} \cdot x^2 + 3.49 \cdot 10^{-5} \cdot x$
■	type-admit-cast-user
	$2.44 \cdot 10^{-7} \cdot x^2 - 1.82 \cdot 10^{-5} \cdot x$
△	type-admit-cast-real
	$2.44 \cdot 10^{-7} \cdot x^2 - 1.78 \cdot 10^{-5} \cdot x$
▲	check-pf-cast-user
	$2.29 \cdot 10^{-7} \cdot x^2 + 4.59 \cdot 10^{-6} \cdot x$
◇	check-pf-cast-real
	$2.29 \cdot 10^{-7} \cdot x^2 + 5.01 \cdot 10^{-6} \cdot x$
◆	check-admit-cast-user
	$2.41 \cdot 10^{-7} \cdot x^2 - 2.5 \cdot 10^{-5} \cdot x$
⬠	check-admit-cast-real
	$2.41 \cdot 10^{-7} \cdot x^2 - 2.49 \cdot 10^{-5} \cdot x$
⬠	type-admit-user
	$2.32 \cdot 10^{-7} \cdot x^2 - 4.58 \cdot 10^{-6} \cdot x$
−	type-admit-real
	$2.32 \cdot 10^{-7} \cdot x^2 - 4.01 \cdot 10^{-6} \cdot x$
⊦	refine-user
	$2.39 \cdot 10^{-7} \cdot x^2 - 4.56 \cdot 10^{-5} \cdot x$
	$4.5 \cdot 10^{-4} \cdot x - 4.9 \cdot 10$
●	refine-real
	$2.38 \cdot 10^{-7} \cdot x^2 - 4.51 \cdot 10^{-5} \cdot x$
	$4.5 \cdot 10^{-4} \cdot x - 4.9 \cdot 10$
●	type-pf-cast-user
	$2.3 \cdot 10^{-7} \cdot x^2 + 7.92 \cdot 10^{-6} \cdot x$
○	type-pf-cast-real
	$2.3 \cdot 10^{-7} \cdot x^2 + 8.07 \cdot 10^{-6} \cdot x$
*	check-admit-user
	$1.7 \cdot 10^{-7} \cdot x^2 + 7.33 \cdot 10^{-5} \cdot x$
*	check-admit-real
	$1.7 \cdot 10^{-7} \cdot x^2 + 7.38 \cdot 10^{-5} \cdot x$
⊕	build-eval-thunk-real
	$9.28 \cdot 10^{-5} \cdot x - 2.11 \cdot 10$
⊗	build-thunk-real
	$9.2 \cdot 10^{-5} \cdot x - 2.75 \cdot 10$
□	build-eval-thunk-user
	$9.23 \cdot 10^{-5} \cdot x - 3.99 \cdot 10$
■	build-thunk-user
	$9.16 \cdot 10^{-5} \cdot x - 4.54 \cdot 10$
△	check-J-user