Figure 1: timing-pattern

1
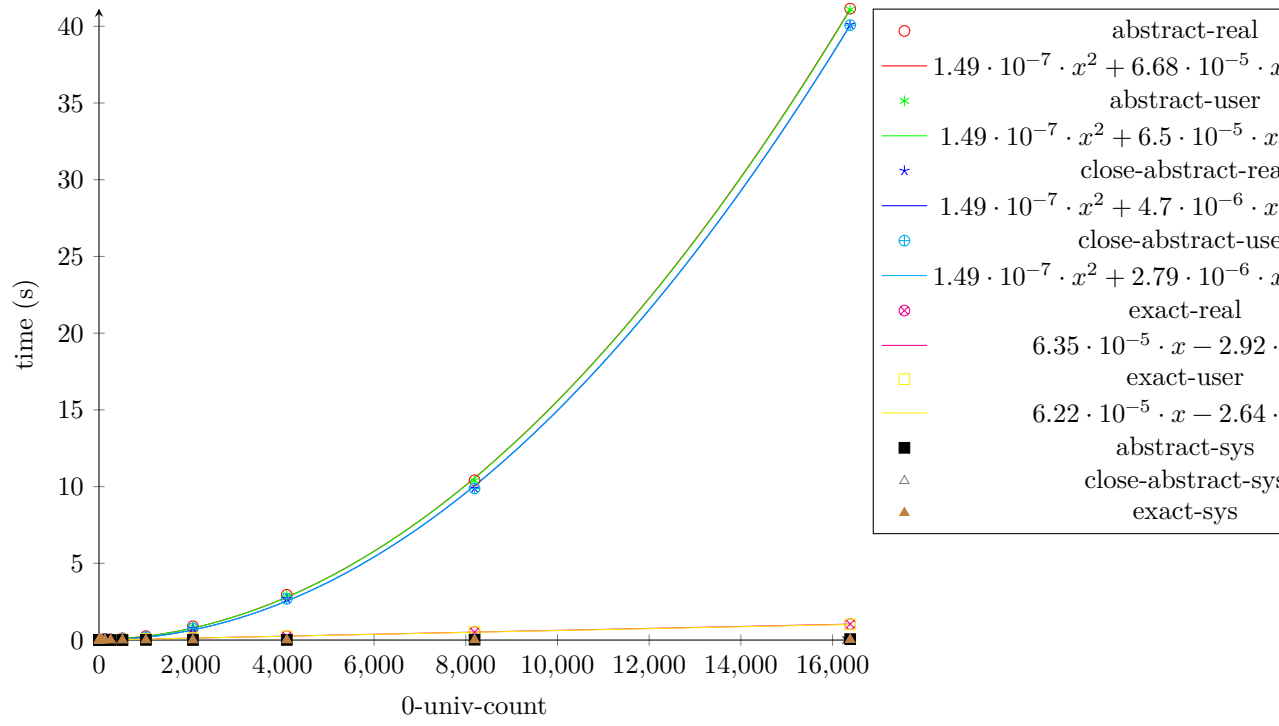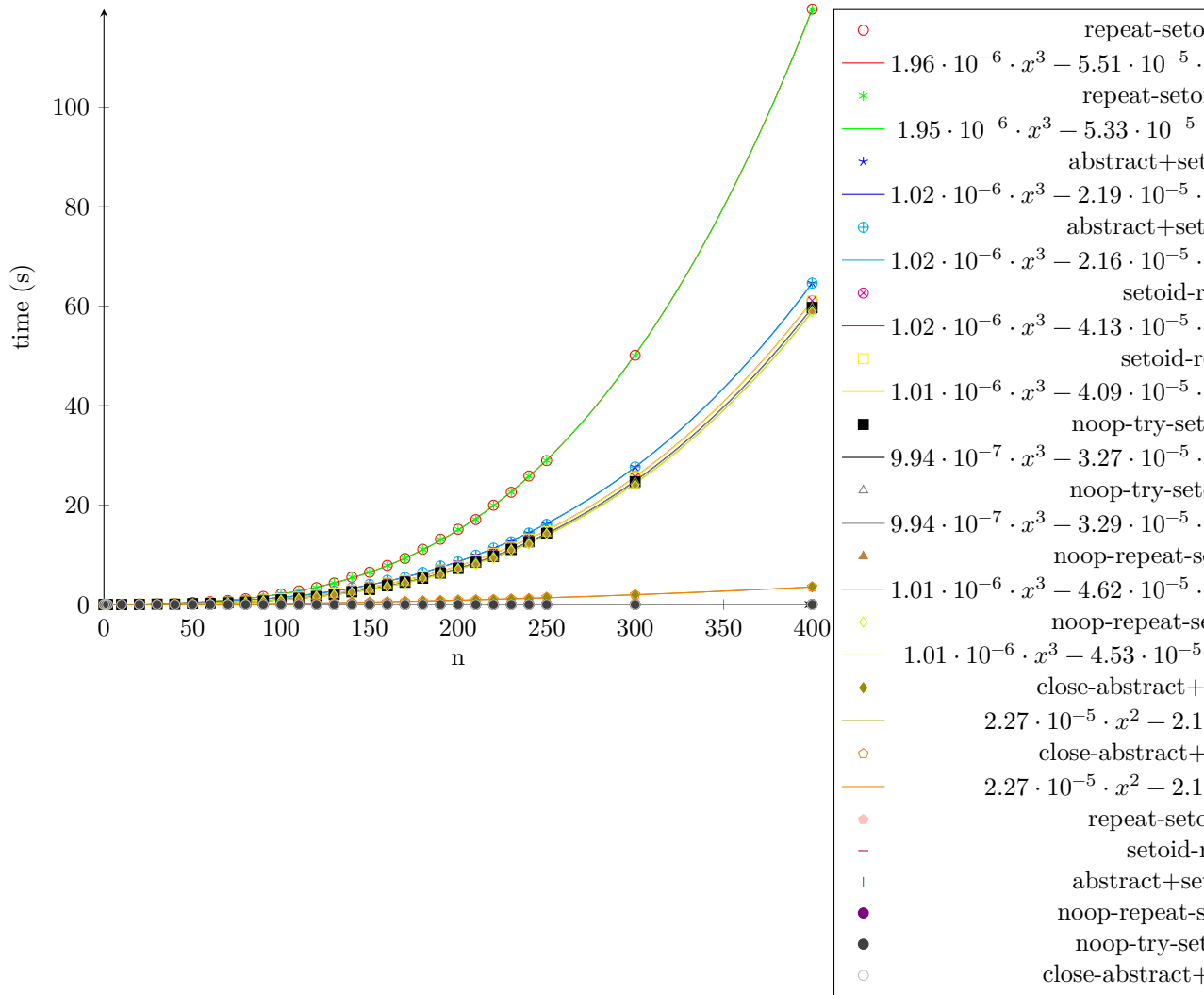
Figure 2: timing-n-polymorphic-universes param-1-n 0
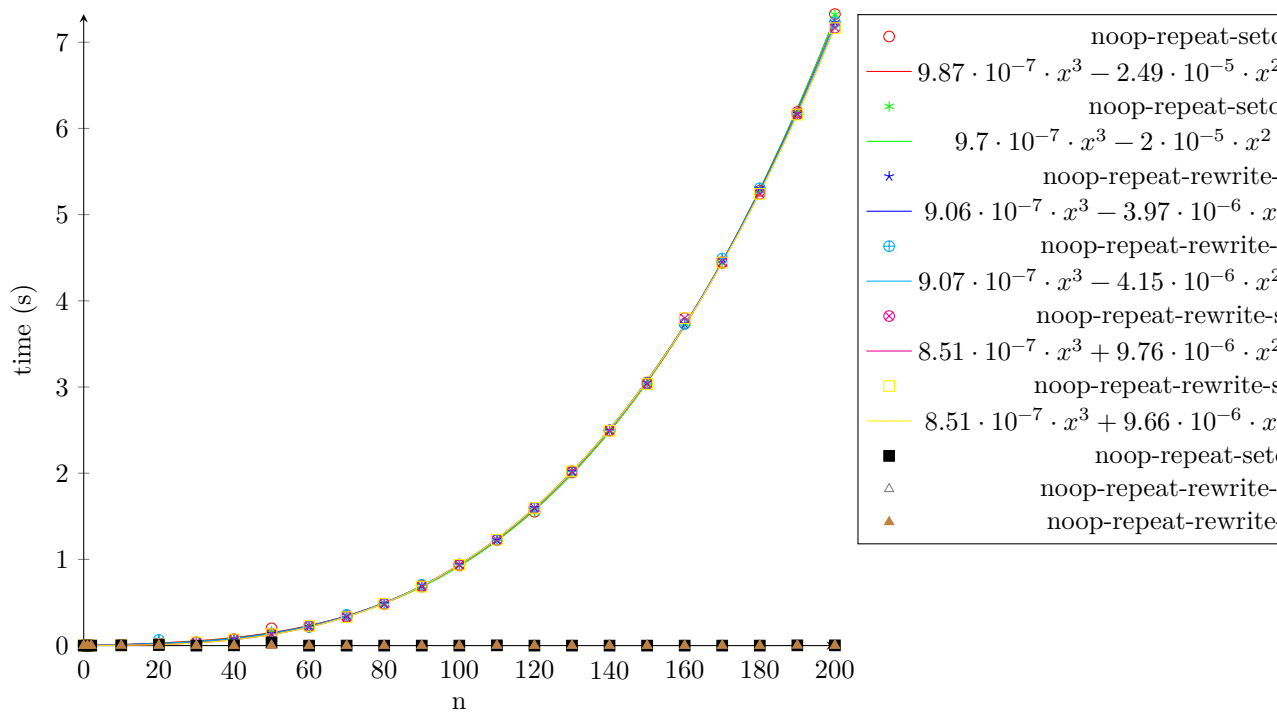
Figure 3: timing-repeat-setoid-rewrite-under-binders

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

4

time (s)

n

Legend:

○ abstract+repeat-rewri...
— $1.46 \cdot 10^{-4} \cdot x^3 - 3.87 \cdot 10^{-3} \cdot x$...

∗ abstract+repeat-rewri...
— $1.46 \cdot 10^{-4} \cdot x^3 - 3.89 \cdot 10^{-3} \cdot x$...

∗ abstract+repeat-rewr...
— $1.4 \cdot 10^{-4} \cdot x^3 - 3.55 \cdot 10^{-3} \cdot x$...

⊕ abstract+repeat-rewr...
— $1.4 \cdot 10^{-4} \cdot x^3 - 3.57 \cdot 10^{-3} \cdot x$...

⊗ repeat-rewrite-str...
— $1.45 \cdot 10^{-4} \cdot x^3 - 3.91 \cdot 10^{-3} \cdot x$...

□ repeat-rewrite-str...
— $1.45 \cdot 10^{-4} \cdot x^3 - 3.92 \cdot 10^{-3} \cdot x$...

■ repeat-rewrite-st...
— $1.4 \cdot 10^{-4} \cdot x^3 - 3.59 \cdot 10^{-3} \cdot x$...

△ repeat-rewrite-st...
— $1.4 \cdot 10^{-4} \cdot x^3 - 3.6 \cdot 10^{-3} \cdot x^2$...

▲ noop-repeat-rewrite...
— $8.13 \cdot 10^{-7} \cdot x^3 + 1.69 \cdot 10^{-5} \cdot$...

◇ noop-repeat-rewrite...
— $7.93 \cdot 10^{-7} \cdot x^3 + 1.97 \cdot 10^{-5} \cdot x$...

◆ noop-repeat-rewrite...
— $9.08 \cdot 10^{-7} \cdot x^3 + 8.01 \cdot 10^{-6} \cdot x$...

⬠ noop-repeat-rewrite...
— $7.29 \cdot 10^{-7} \cdot x^3 + 2.34 \cdot 10^{-5} \cdot$...

⬠ close-abstract+repeat-re...
— $2.28 \cdot 10^{-5} \cdot x^2 + 1.58$...

– close-abstract+repeat-re...
— $2.17 \cdot 10^{-5} \cdot x^2 + 1.9$...

| close-abstract+repeat-re...
— $2.07 \cdot 10^{-5} \cdot x^2 + 2.58$...

● close-abstract+repeat-re...
— $2.1 \cdot 10^{-5} \cdot x^2 + 2.37$...

● repeat-rewrite-s...
○ repeat-rewrite-st...
∗ abstract+repeat-rewr...
∗ abstract+repeat-rewr...
⊕ noop-repeat-rewrit...
⊗ noop-repeat-rewrite...
□ close-abstract+repeat-re...
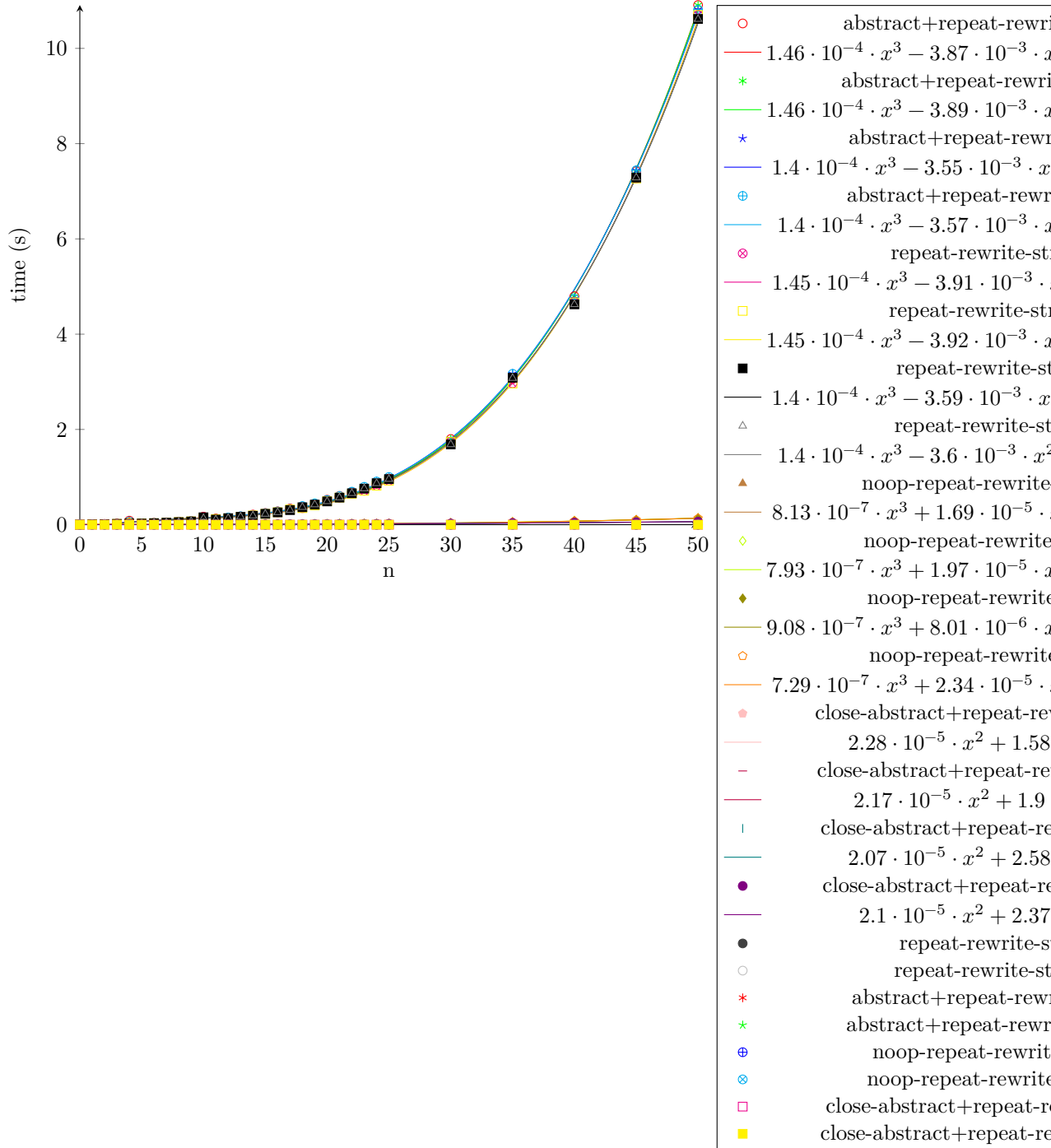■ close-abstract+repeat-re...

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

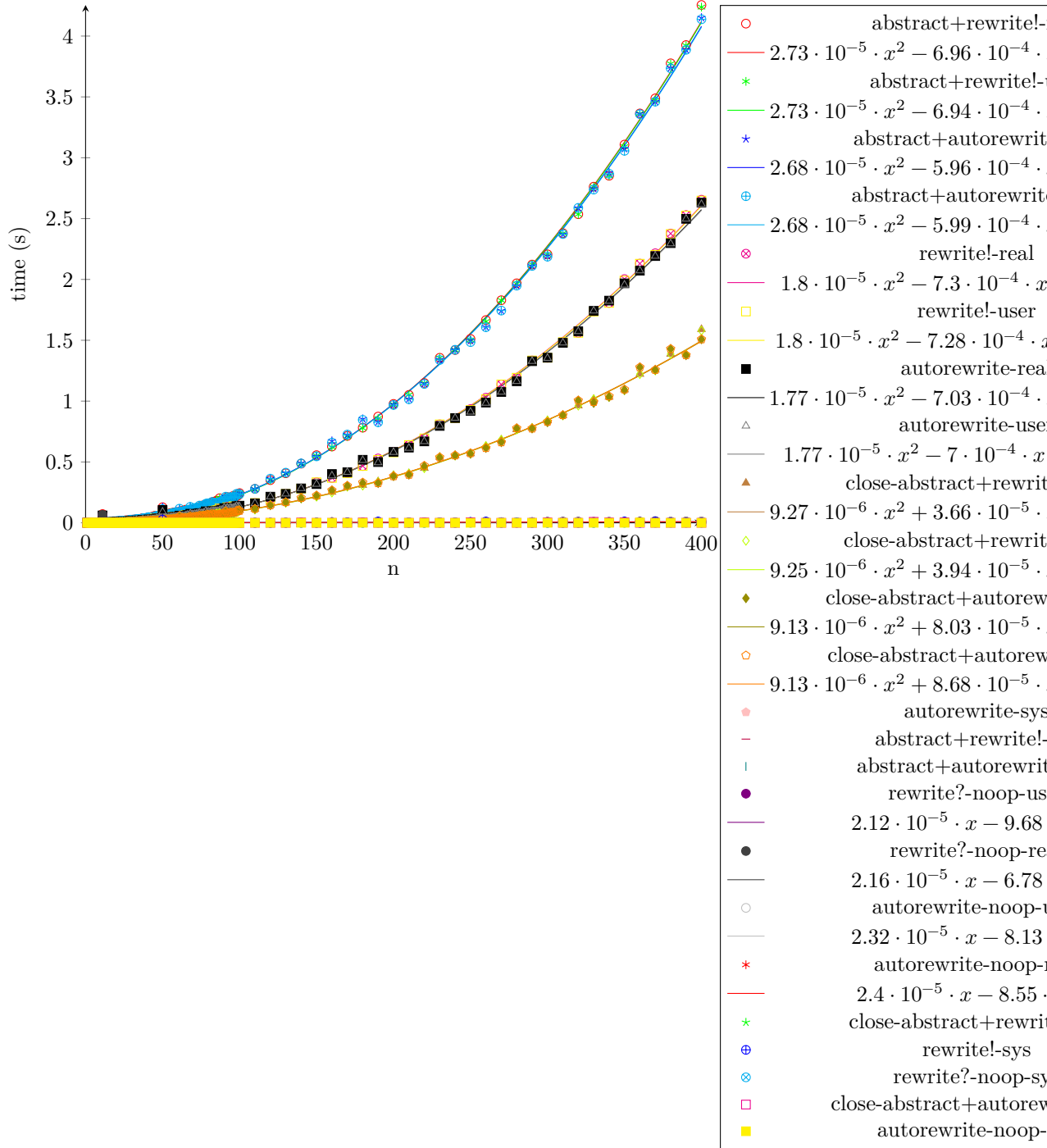Figure 6: timing-rewrite-repeated-app-autorewrite

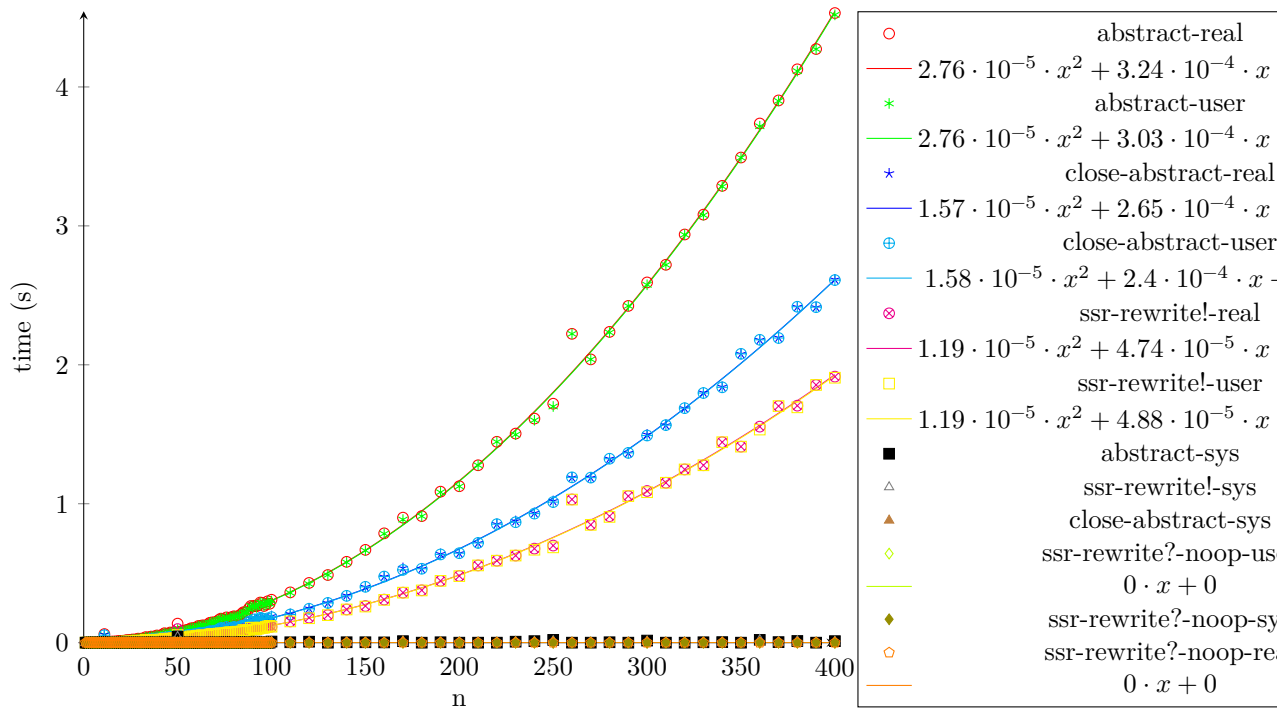Figure 7: timing-rewrite-repeated-app-autorewrite-noop

7

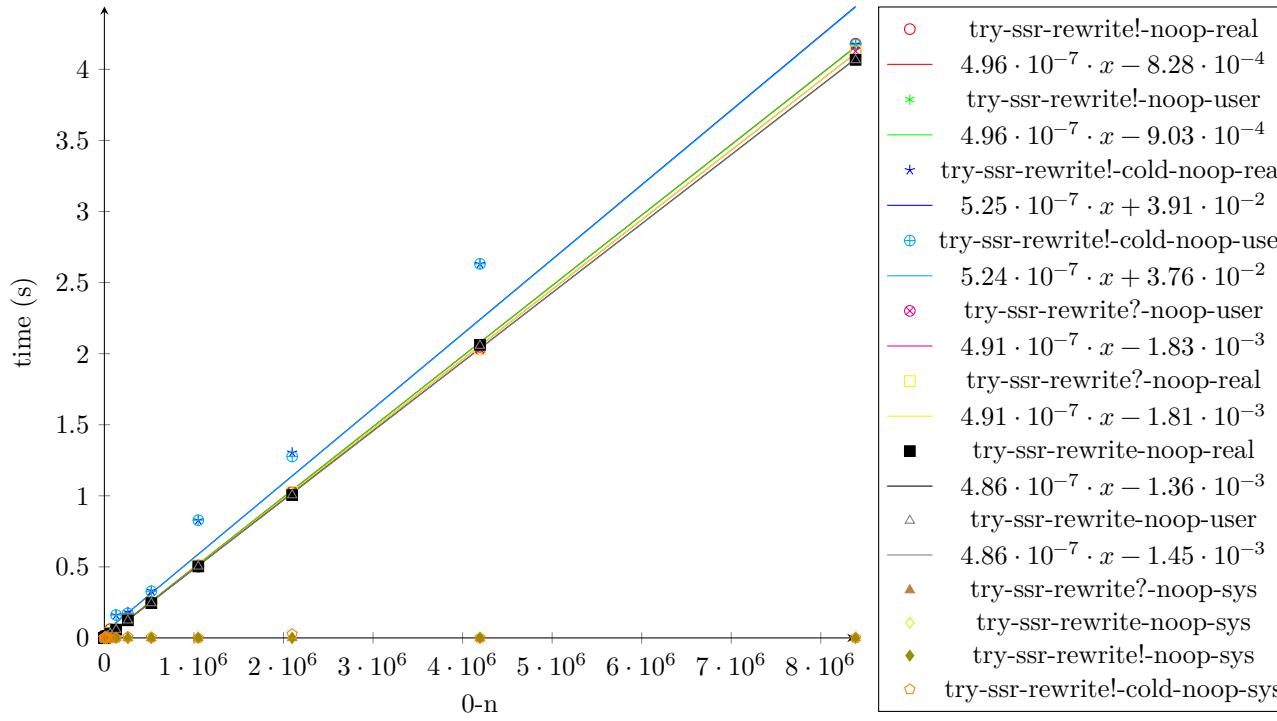Figure 8: timing-rewrite-repeated-app-ssrrewrite

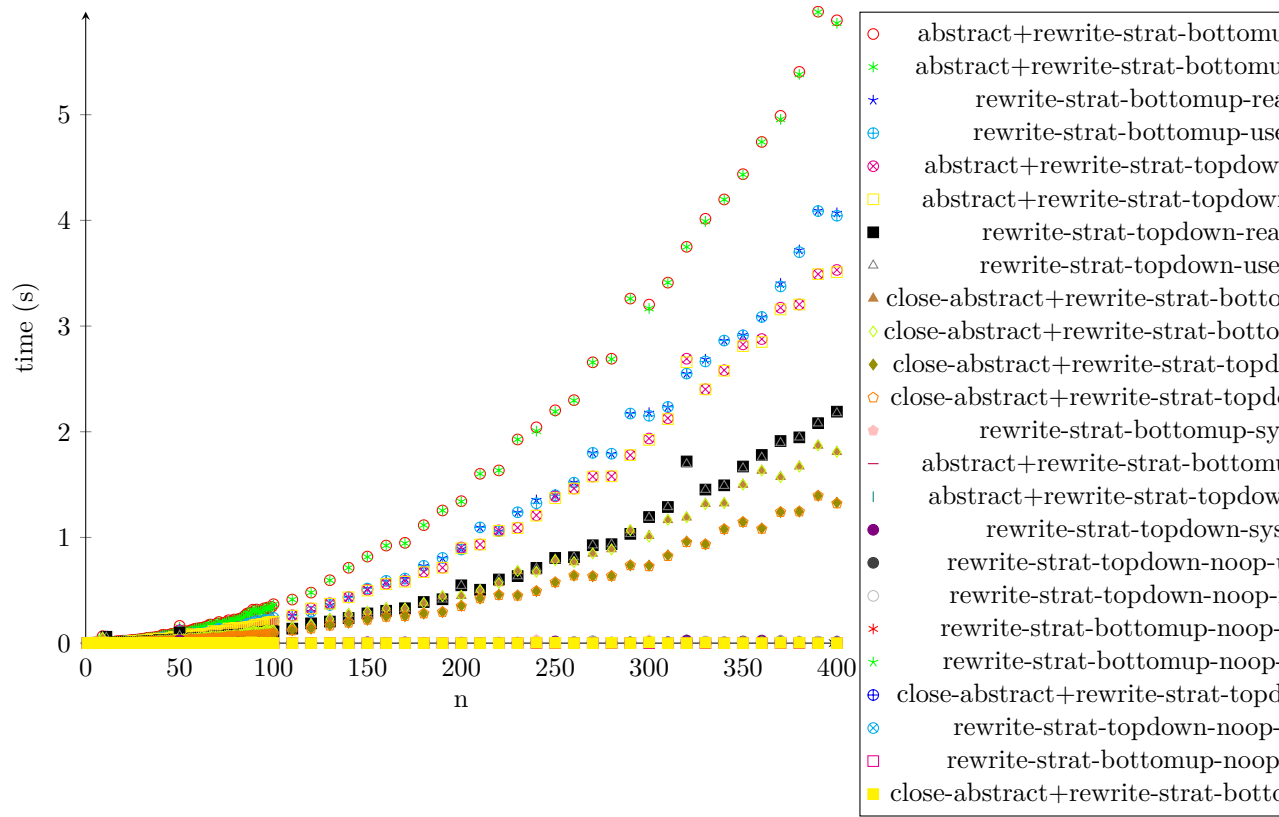Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn   1

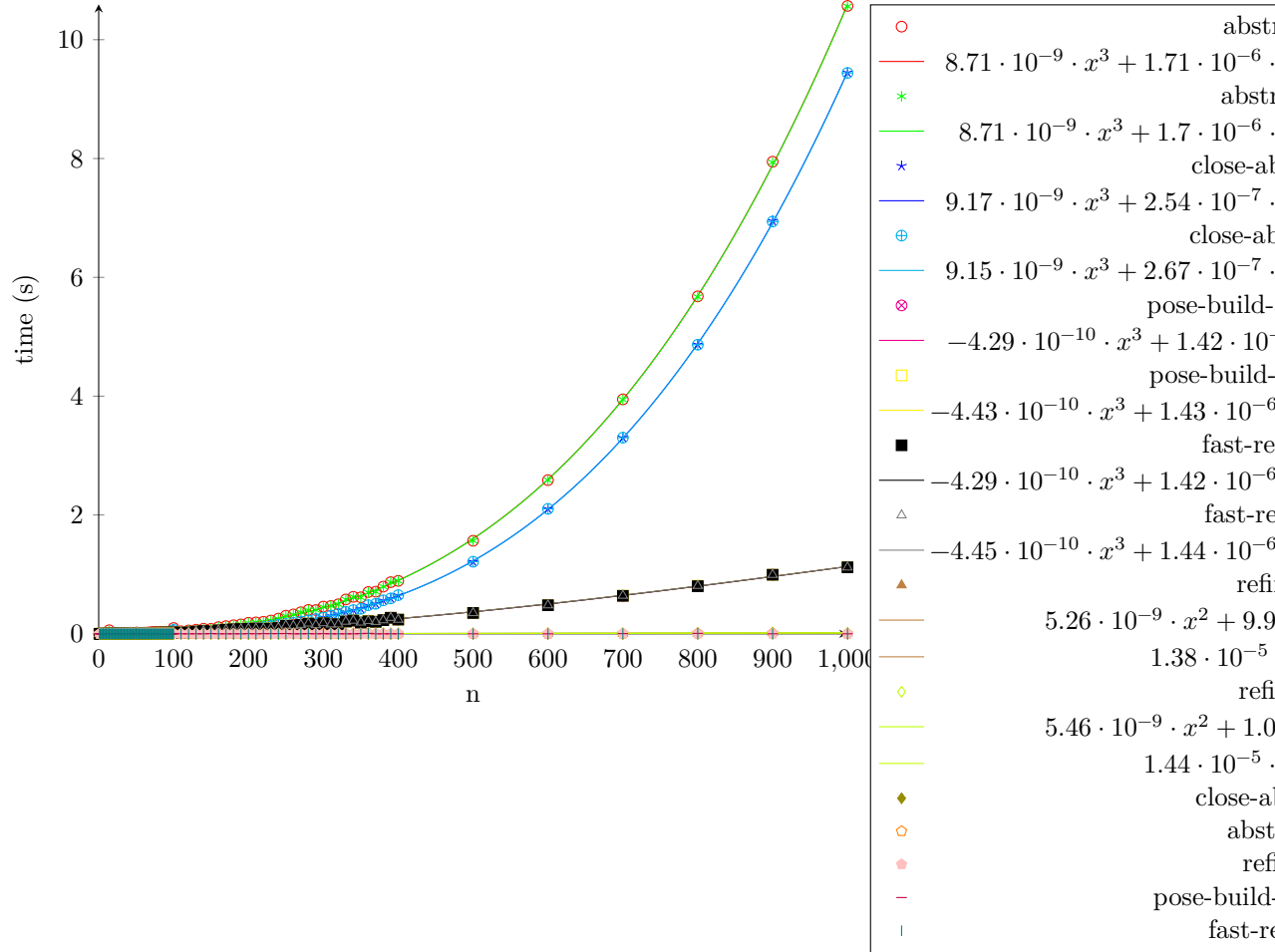Figure 10: timing-rewrite-repeated-app-rewrite-strat

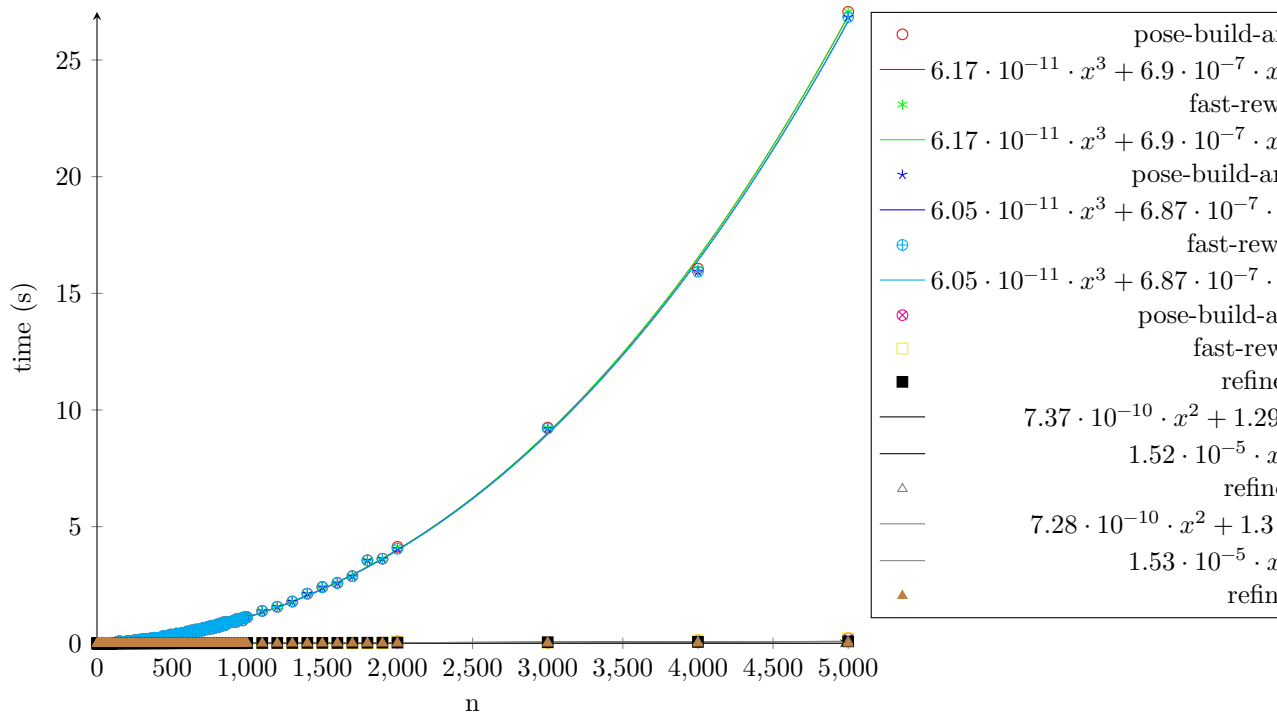Figure 11: timing-rewrite-repeated-app-fast-rewrite

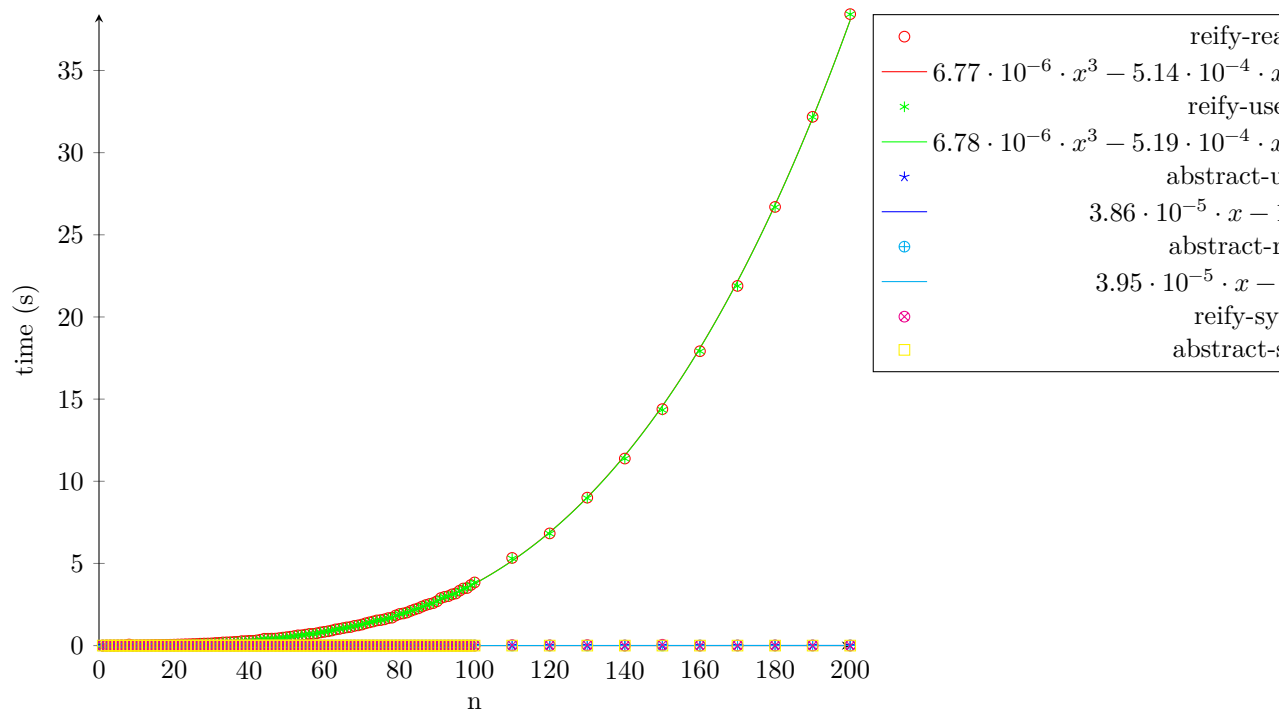Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract
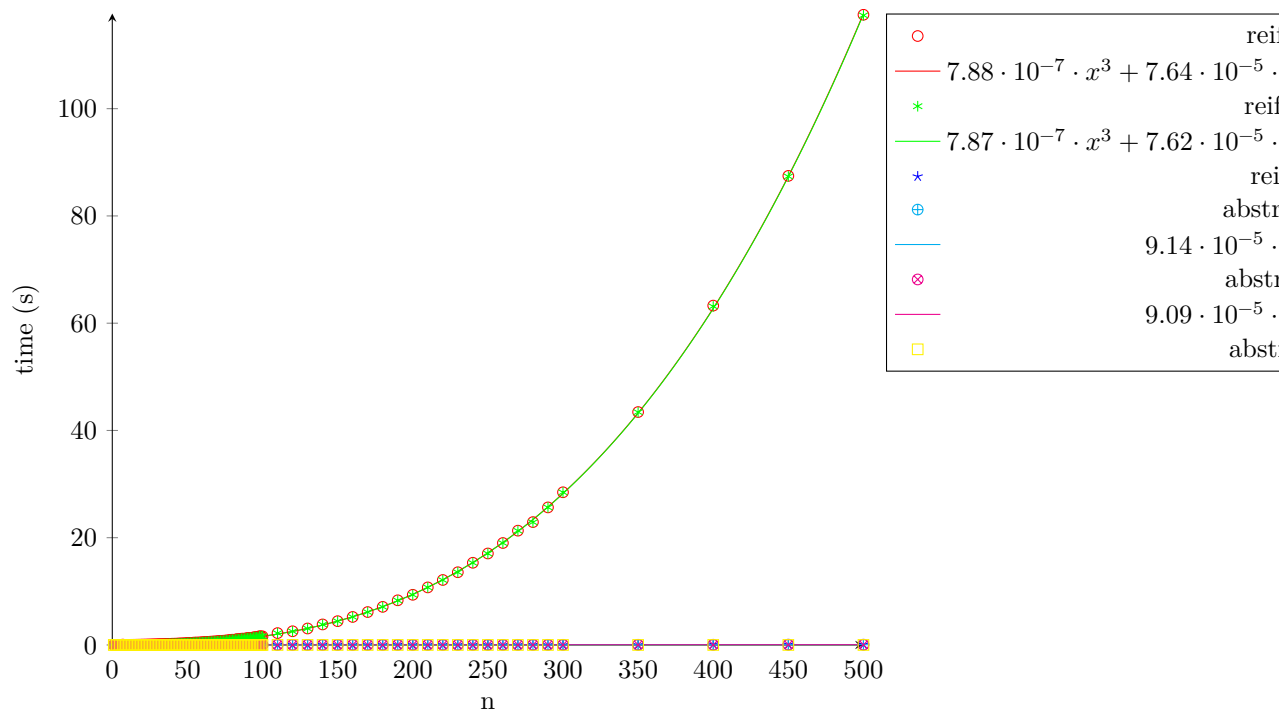
Figure 13: timing-typeclass-reification-let-in-HOAS

13

Figure 14: timing-typeclass-reification-let-in-PHOAS

time (s)

20

15

10

5

0

0   500   1,000   1,500   2,000   2,500   3,000

n

abstract-real
$2.78 \cdot 10^{-6} \cdot x^2 - 1.56 \cdot 10^{-3}$

abstract-user
$2.78 \cdot 10^{-6} \cdot x^2 - 1.56 \cdot 10^{-3}$

fast-rewrite-real
$2.49 \cdot 10^{-6} \cdot x^2 - 1.61 \cdot 10^{-3}$

fast-rewrite-user
$2.48 \cdot 10^{-6} \cdot x^2 - 1.61 \cdot 10^{-3}$

type-pf-cast-user
$3.96 \cdot 10^{-7} \cdot x^2 - 3.21 \cdot 10^{-4} \cdot x$

type-pf-cast-real
$3.96 \cdot 10^{-7} \cdot x^2 - 3.21 \cdot 10^{-4} \cdot x$

close-abstract-real
$2.96 \cdot 10^{-7} \cdot x^2 + 4.83 \cdot 10^{-5} \cdot x$

close-abstract-user
$2.97 \cdot 10^{-7} \cdot x^2 + 4.71 \cdot 10^{-5} \cdot x$

type-admit-cast-real
$3.92 \cdot 10^{-7} \cdot x^2 - 3.15 \cdot 10^{-4} \cdot x$

type-admit-cast-user
$3.92 \cdot 10^{-7} \cdot x^2 - 3.15 \cdot 10^{-4} \cdot x$

type-admit-real
$3.82 \cdot 10^{-7} \cdot x^2 - 3.03 \cdot 10^{-4} \cdot x$

type-admit-user
$3.81 \cdot 10^{-7} \cdot x^2 - 3.02 \cdot 10^{-4} \cdot x$

check-admit-cast-user
$3.64 \cdot 10^{-7} \cdot x^2 - 2.66 \cdot 10^{-4} \cdot x$

check-admit-cast-real
$3.64 \cdot 10^{-7} \cdot x^2 - 2.66 \cdot 10^{-4} \cdot x$

refine-user
$3.53 \cdot 10^{-7} \cdot x^2 - 2.68 \cdot 10^{-4} \cdot x$
$4.64 \cdot 10^{-4} \cdot x - 5.56 \cdot$

refine-real
$3.53 \cdot 10^{-7} \cdot x^2 - 2.68 \cdot 10^{-4} \cdot x$
$4.64 \cdot 10^{-4} \cdot x - 5.56 \cdot$

check-pf-cast-real
$3.42 \cdot 10^{-7} \cdot x^2 - 2.23 \cdot 10^{-4} \cdot x$

check-pf-cast-user
$3.41 \cdot 10^{-7} \cdot x^2 - 2.22 \cdot 10^{-4} \cdot x$

check-admit-real
$2.54 \cdot 10^{-7} \cdot x^2 - 1.12 \cdot 10^{-4} \cdot x$

check-admit-user
$2.54 \cdot 10^{-7} \cdot x^2 - 1.12 \cdot 10^{-4} \cdot x$

build-eval-thunk-real
$1.2 \cdot 10^{-4} \cdot x - 5.97 \cdot$

build-thunk-real
$1.19 \cdot 10^{-4} \cdot x - 7.26 \cdot$

build-eval-thunk-user
$1.19 \cdot 10^{-4} \cdot x - 6.7 \cdot$

build-thunk-user
$1.18 \cdot 10^{-4} \cdot x - 7.75 \cdot$

check-I-user