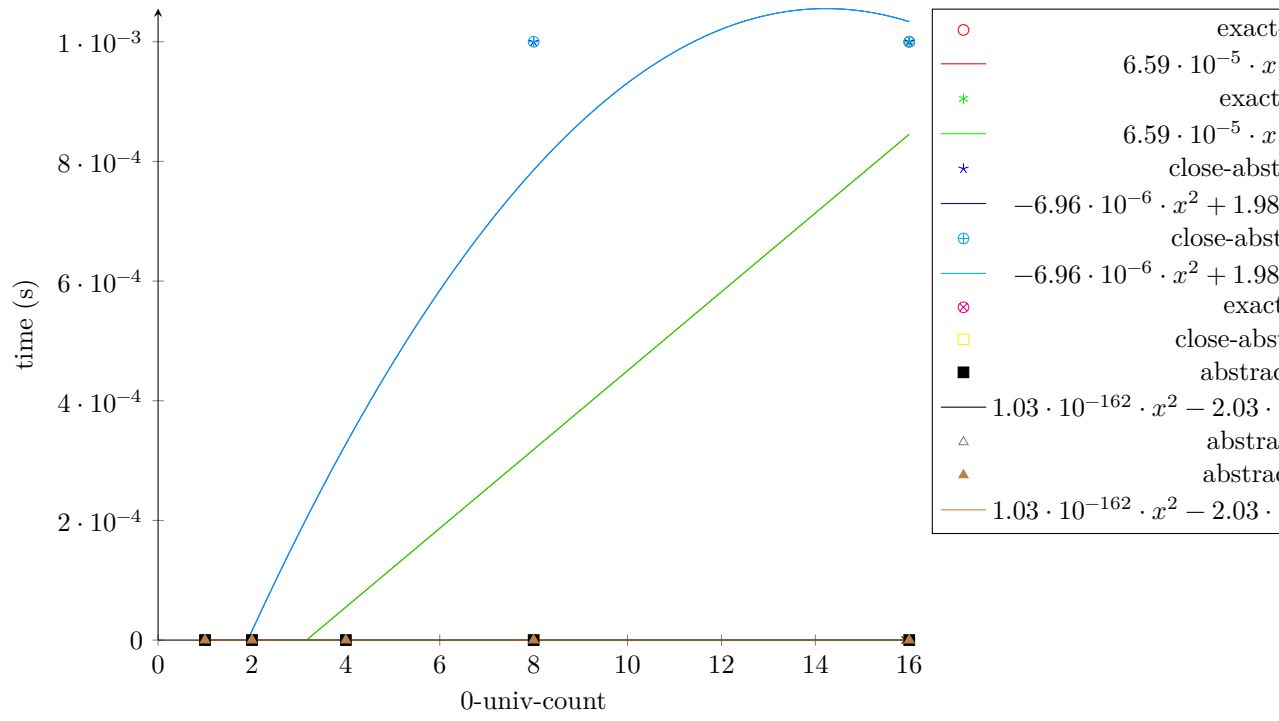Figure 1: timing-pattern

1

Figure 2: timing-n-polymorphic-universes param-1-n 0
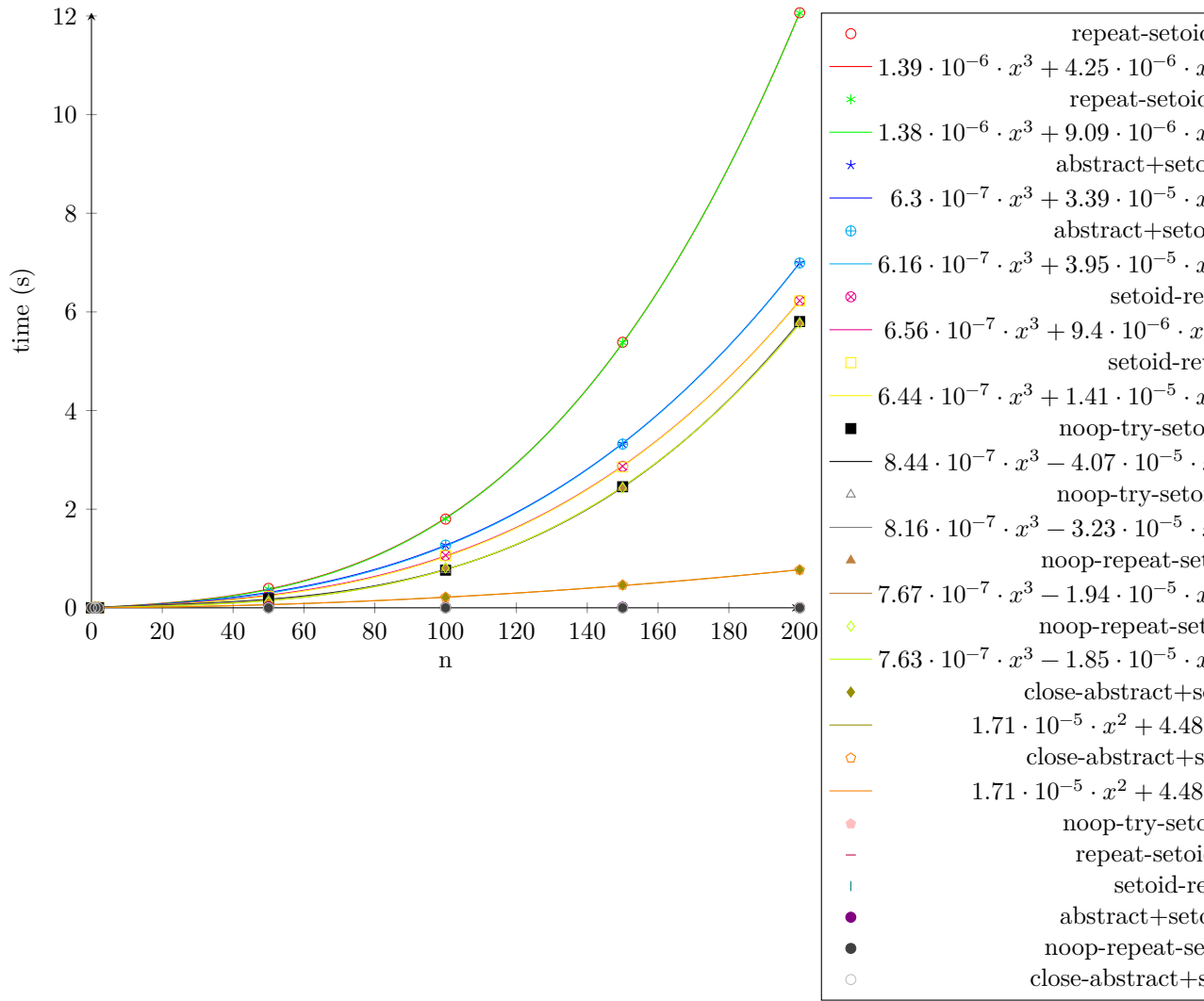
Figure 3: timing-repeat-setoid-rewrite-under-binders
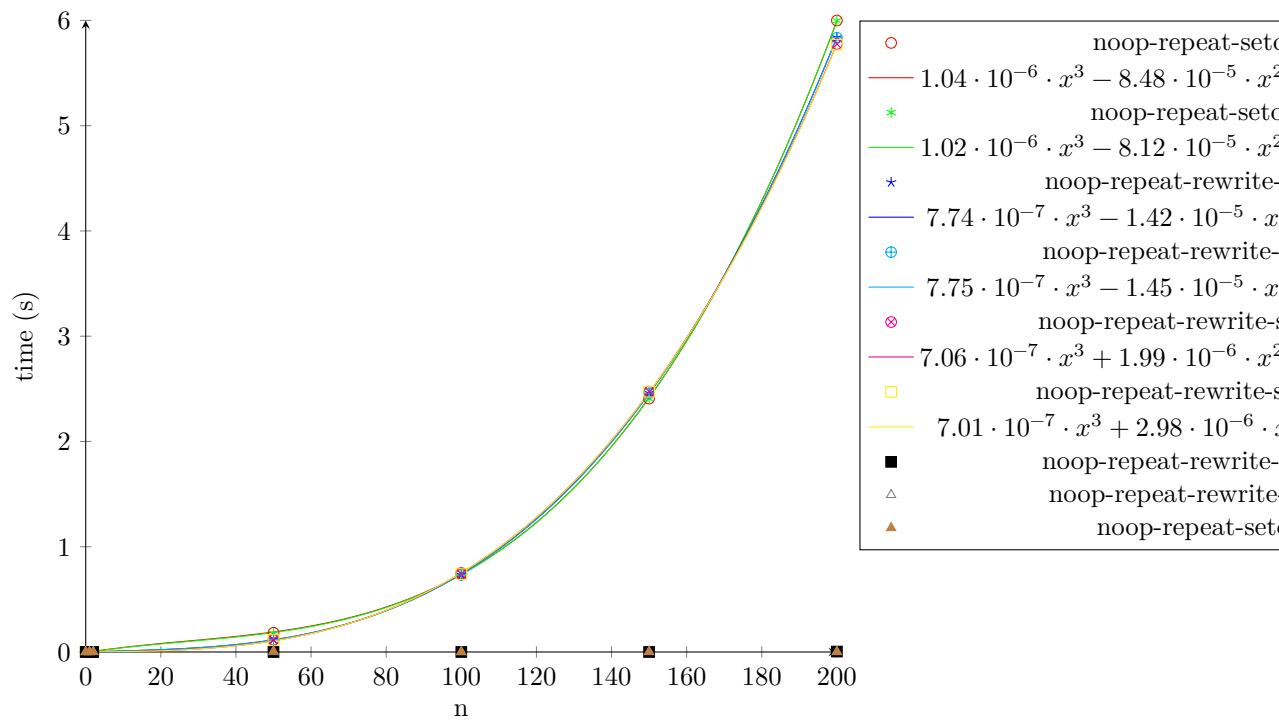
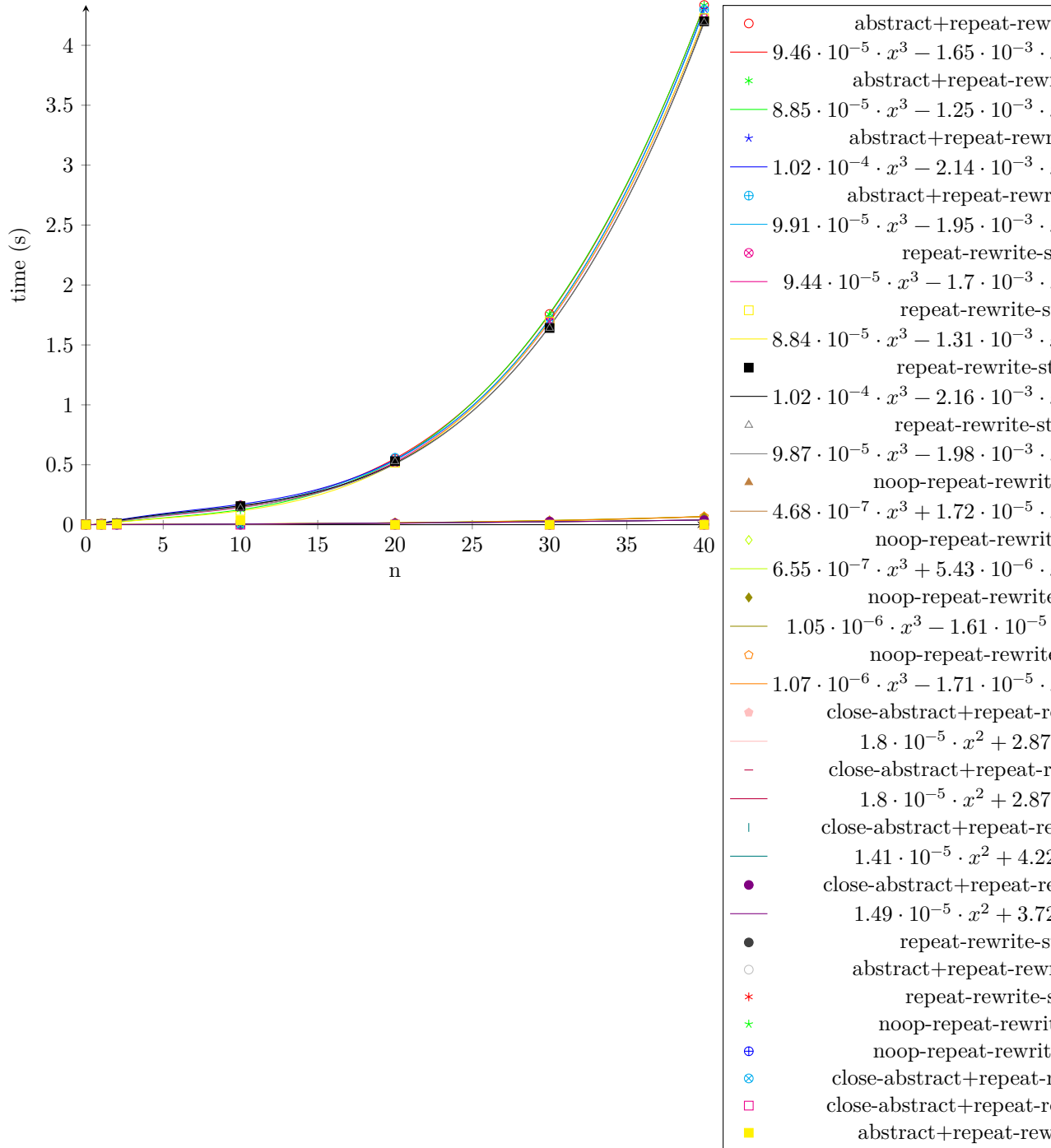Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

4

$\circ$ abstract+repeat-rew

$9.46 \cdot 10^{-5} \cdot x^3 - 1.65 \cdot 10^{-3} \cdot$

$*$ abstract+repeat-rew

$8.85 \cdot 10^{-5} \cdot x^3 - 1.25 \cdot 10^{-3} \cdot$

$*$ abstract+repeat-rewr

$1.02 \cdot 10^{-4} \cdot x^3 - 2.14 \cdot 10^{-3} \cdot$

$\oplus$ abstract+repeat-rewr

$9.91 \cdot 10^{-5} \cdot x^3 - 1.95 \cdot 10^{-3} \cdot$

$\otimes$ repeat-rewrite-s

$9.44 \cdot 10^{-5} \cdot x^3 - 1.7 \cdot 10^{-3} \cdot$

$\square$ repeat-rewrite-s

$8.84 \cdot 10^{-5} \cdot x^3 - 1.31 \cdot 10^{-3} \cdot$

$\blacksquare$ repeat-rewrite-st

$1.02 \cdot 10^{-4} \cdot x^3 - 2.16 \cdot 10^{-3} \cdot$

$\triangle$ repeat-rewrite-st

$9.87 \cdot 10^{-5} \cdot x^3 - 1.98 \cdot 10^{-3} \cdot$

$\blacktriangle$ noop-repeat-rewrit

$4.68 \cdot 10^{-7} \cdot x^3 + 1.72 \cdot 10^{-5} \cdot$

$\diamond$ noop-repeat-rewrit

$6.55 \cdot 10^{-7} \cdot x^3 + 5.43 \cdot 10^{-6} \cdot$

$\blacklozenge$ noop-repeat-rewrit

$1.05 \cdot 10^{-6} \cdot x^3 - 1.61 \cdot 10^{-5}$

$\pentagon$ noop-repeat-rewrit

$1.07 \cdot 10^{-6} \cdot x^3 - 1.71 \cdot 10^{-5} \cdot$

  close-abstract+repeat-r

$1.8 \cdot 10^{-5} \cdot x^2 + 2.87$

$-$ close-abstract+repeat-r

$1.8 \cdot 10^{-5} \cdot x^2 + 2.87$

$|$ close-abstract+repeat-re

$1.41 \cdot 10^{-5} \cdot x^2 + 4.22$

$\bullet$ close-abstract+repeat-re

$1.49 \cdot 10^{-5} \cdot x^2 + 3.72$

$\bullet$ repeat-rewrite-s

$\circ$ abstract+repeat-rewr

$*$ repeat-rewrite-s

$*$ noop-repeat-rewrit

$\oplus$ noop-repeat-rewrit

$\otimes$ close-abstract+repeat-r

$\square$ close-abstract+repeat-r

$\blacksquare$ abstract+repeat-rew

Figure 5: timing-rewrite-strat-under-binders
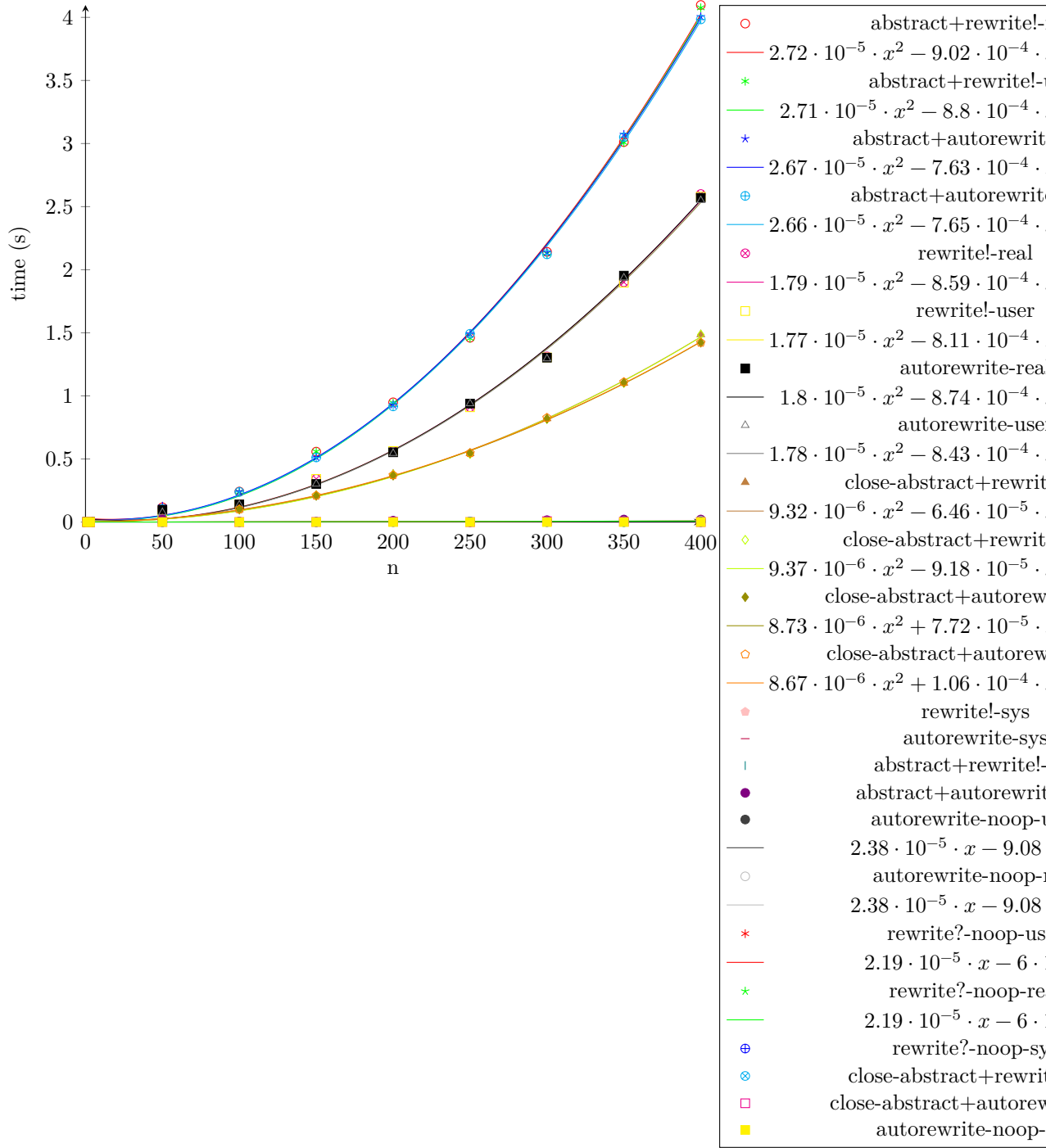
Figure 6: timing-rewrite-repeated-app-autorewrite

abstract+rewrite!-
$2.72 \cdot 10^{-5} \cdot x^2 - 9.02 \cdot 10^{-4} \cdot$

abstract+rewrite!-u
$2.71 \cdot 10^{-5} \cdot x^2 - 8.8 \cdot 10^{-4} \cdot$

abstract+autorewrit
$2.67 \cdot 10^{-5} \cdot x^2 - 7.63 \cdot 10^{-4} \cdot$

abstract+autorewrit
$2.66 \cdot 10^{-5} \cdot x^2 - 7.65 \cdot 10^{-4} \cdot$

rewrite!-real
$1.79 \cdot 10^{-5} \cdot x^2 - 8.59 \cdot 10^{-4} \cdot$

rewrite!-user
$1.77 \cdot 10^{-5} \cdot x^2 - 8.11 \cdot 10^{-4} \cdot$

autorewrite-rea
$1.8 \cdot 10^{-5} \cdot x^2 - 8.74 \cdot 10^{-4} \cdot$

autorewrite-use
$1.78 \cdot 10^{-5} \cdot x^2 - 8.43 \cdot 10^{-4} \cdot$

close-abstract+rewrit
$9.32 \cdot 10^{-6} \cdot x^2 - 6.46 \cdot 10^{-5} \cdot$

close-abstract+rewrit
$9.37 \cdot 10^{-6} \cdot x^2 - 9.18 \cdot 10^{-5} \cdot$

close-abstract+autorew
$8.73 \cdot 10^{-6} \cdot x^2 + 7.72 \cdot 10^{-5} \cdot$

close-abstract+autorew
$8.67 \cdot 10^{-6} \cdot x^2 + 1.06 \cdot 10^{-4} \cdot$

rewrite!-sys

autorewrite-sys

abstract+rewrite!-

abstract+autorewrit

autorewrite-noop-u
$2.38 \cdot 10^{-5} \cdot x - 9.08$

autorewrite-noop-
$2.38 \cdot 10^{-5} \cdot x - 9.08$

rewrite?-noop-us
$2.19 \cdot 10^{-5} \cdot x - 6 \cdot$

rewrite?-noop-re
$2.19 \cdot 10^{-5} \cdot x - 6 \cdot$

rewrite?-noop-sy

close-abstract+rewrit

close-abstract+autorew

autorewrite-noop-

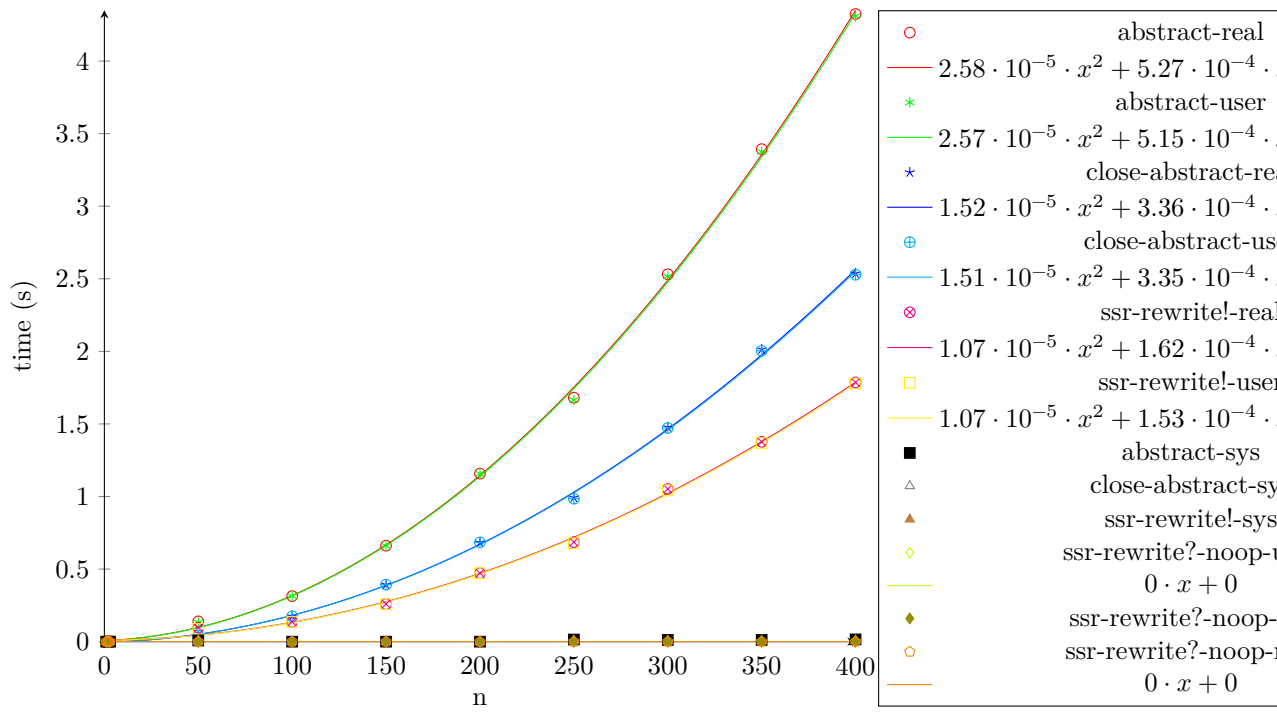Figure 7: timing-rewrite-repeated-app-autorewrite-noop

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

Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn   1
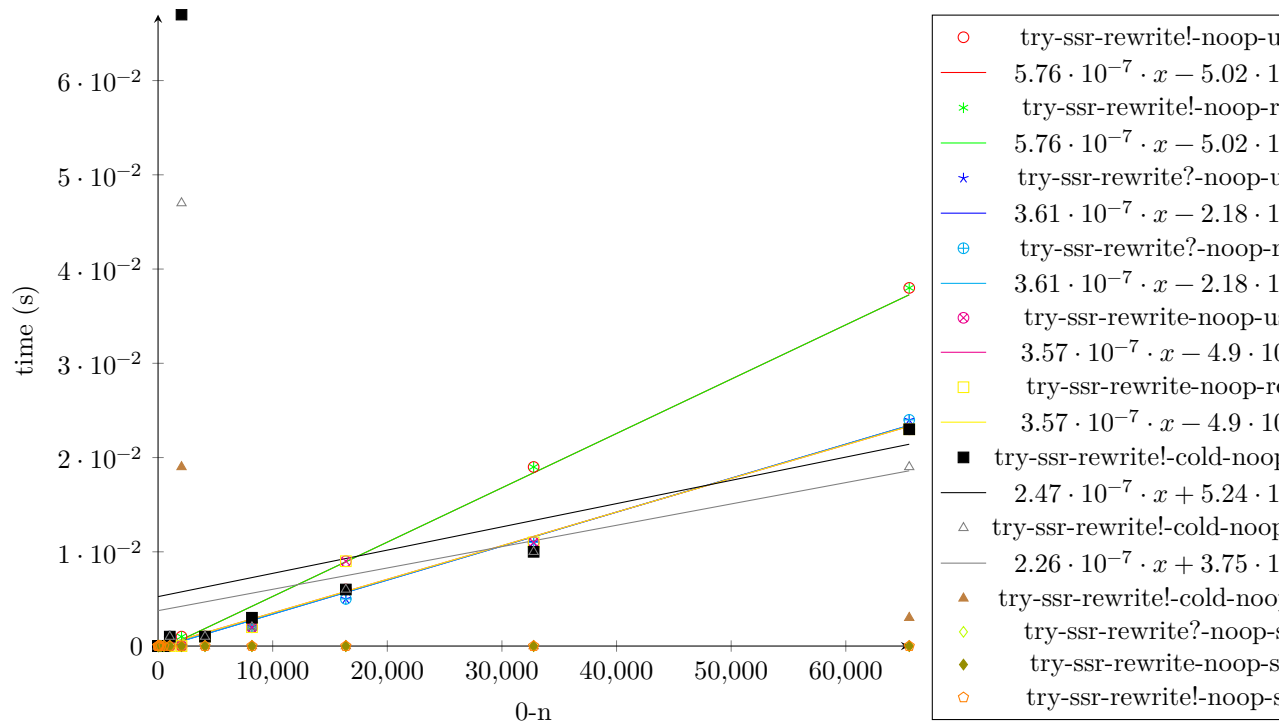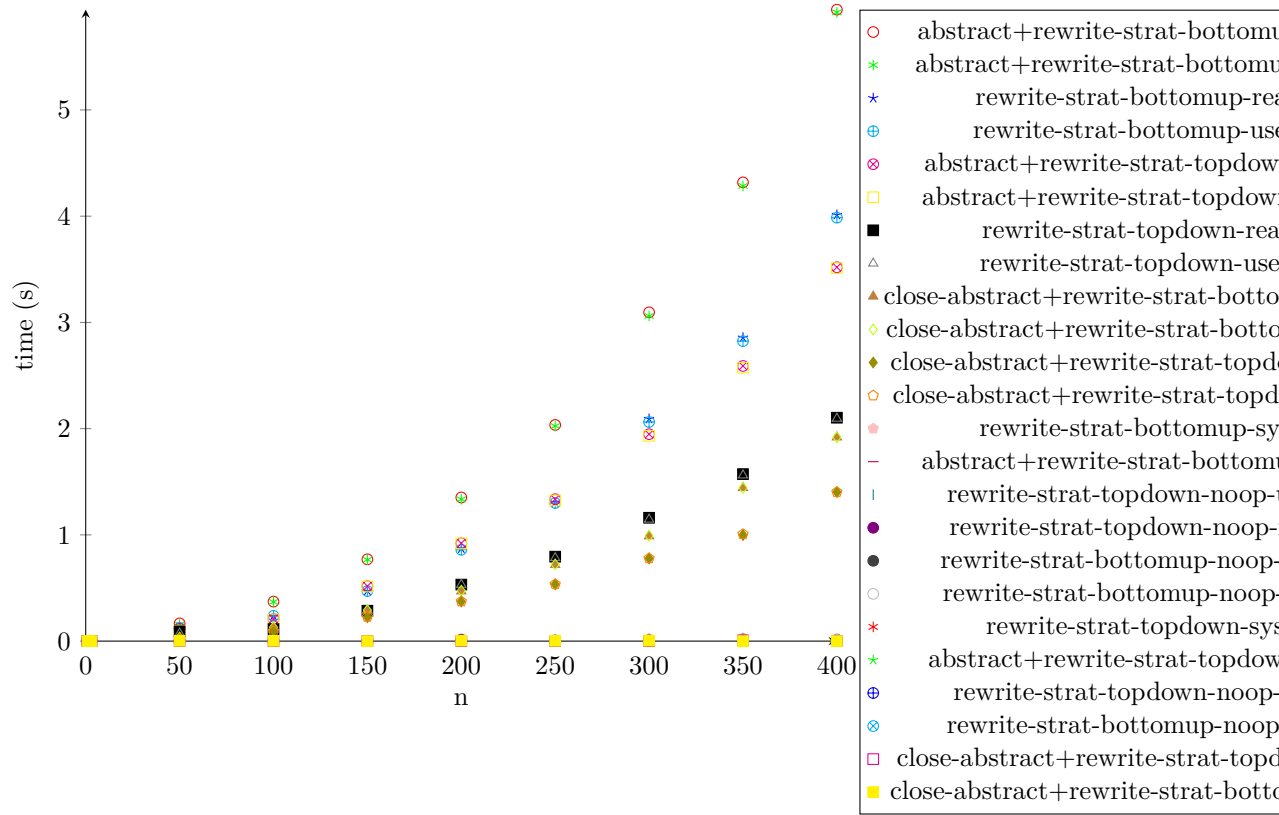
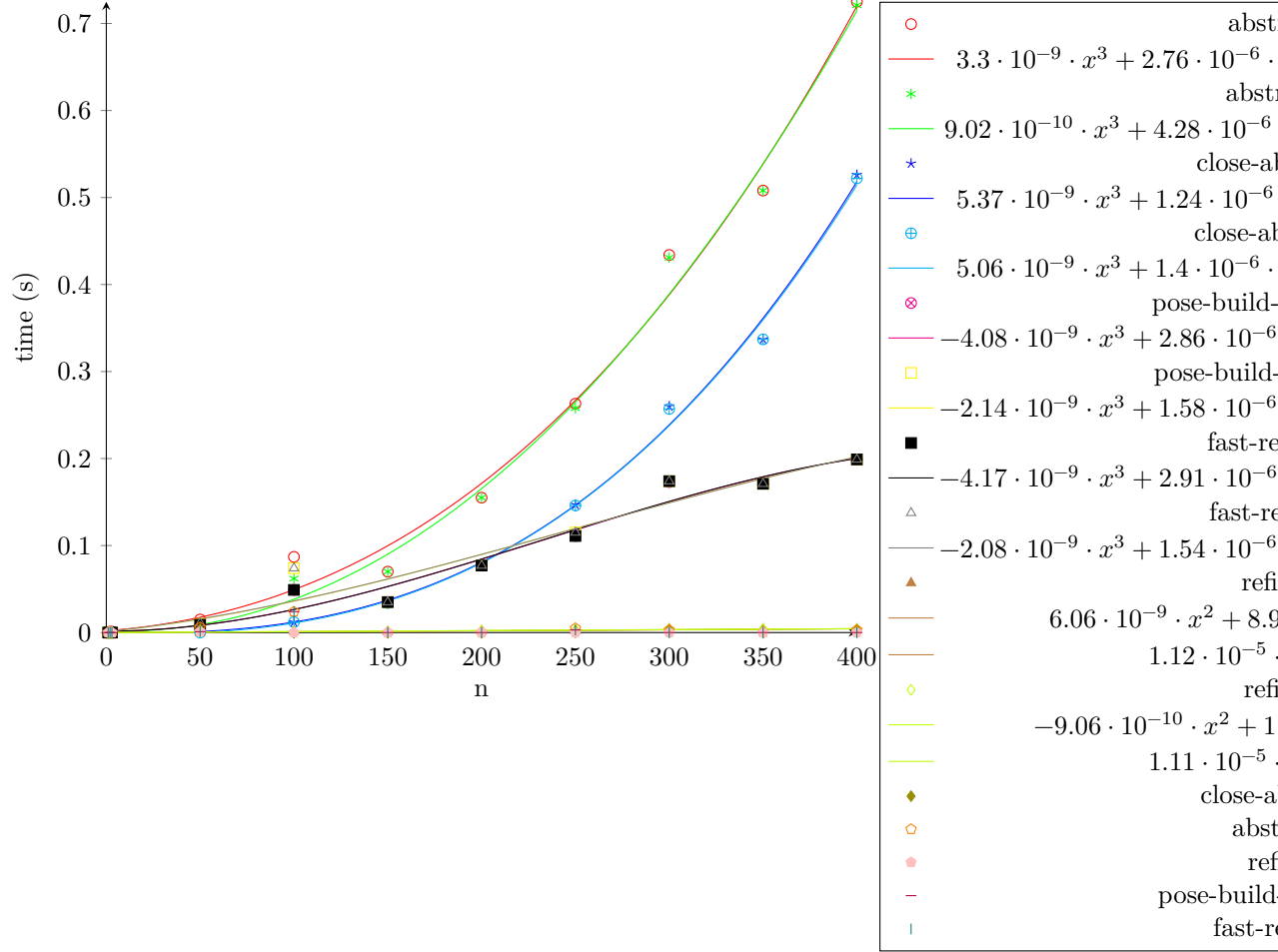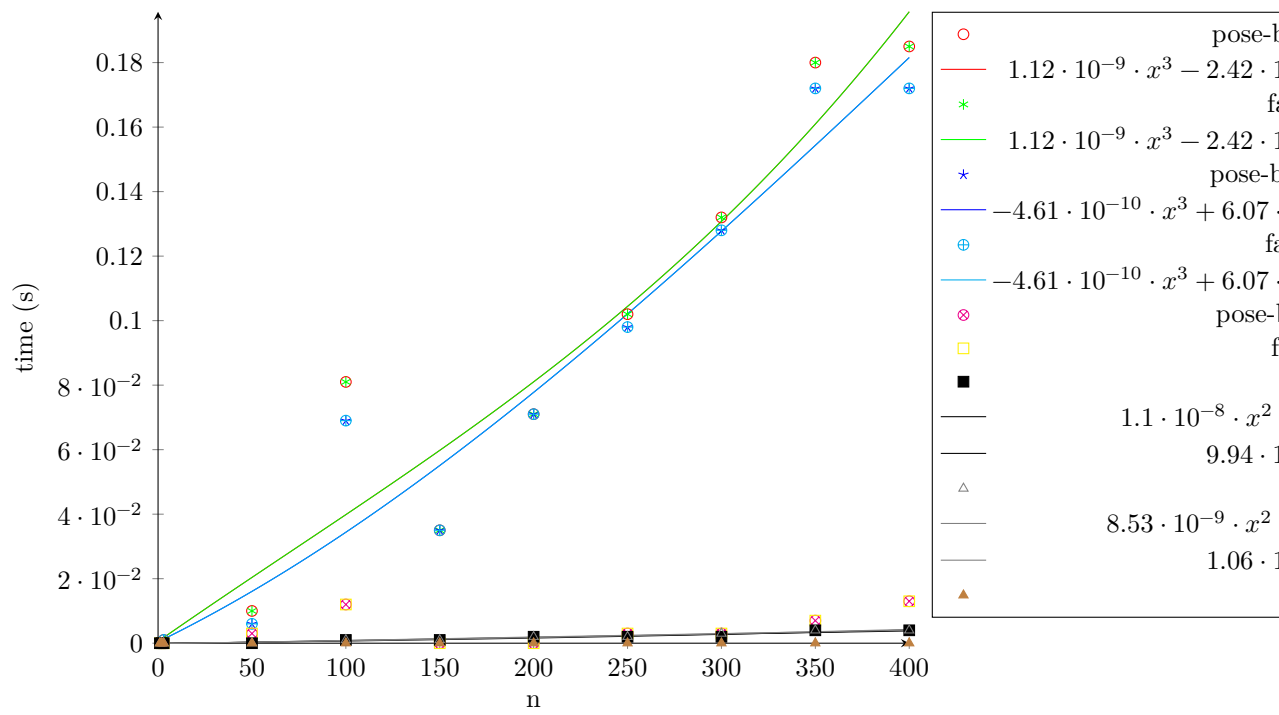Figure 10: timing-rewrite-repeated-app-rewrite-strat

time (s)

n

abst

$3.3 \cdot 10^{-9} \cdot x^3 + 2.76 \cdot 10^{-6} \cdot$

abstr

$9.02 \cdot 10^{-10} \cdot x^3 + 4.28 \cdot 10^{-6}$

close-a

$5.37 \cdot 10^{-9} \cdot x^3 + 1.24 \cdot 10^{-6}$

close-a

$5.06 \cdot 10^{-9} \cdot x^3 + 1.4 \cdot 10^{-6} \cdot$

pose-build-

$-4.08 \cdot 10^{-9} \cdot x^3 + 2.86 \cdot 10^{-6}$

pose-build-

$-2.14 \cdot 10^{-9} \cdot x^3 + 1.58 \cdot 10^{-6}$

fast-re

$-4.17 \cdot 10^{-9} \cdot x^3 + 2.91 \cdot 10^{-6}$

fast-re

$-2.08 \cdot 10^{-9} \cdot x^3 + 1.54 \cdot 10^{-6}$

refi

$6.06 \cdot 10^{-9} \cdot x^2 + 8.9$

$1.12 \cdot 10^{-5} \cdot$

refi

$-9.06 \cdot 10^{-10} \cdot x^2 + 1$

$1.11 \cdot 10^{-5} \cdot$

close-a

abst

ref

pose-build-

fast-re

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

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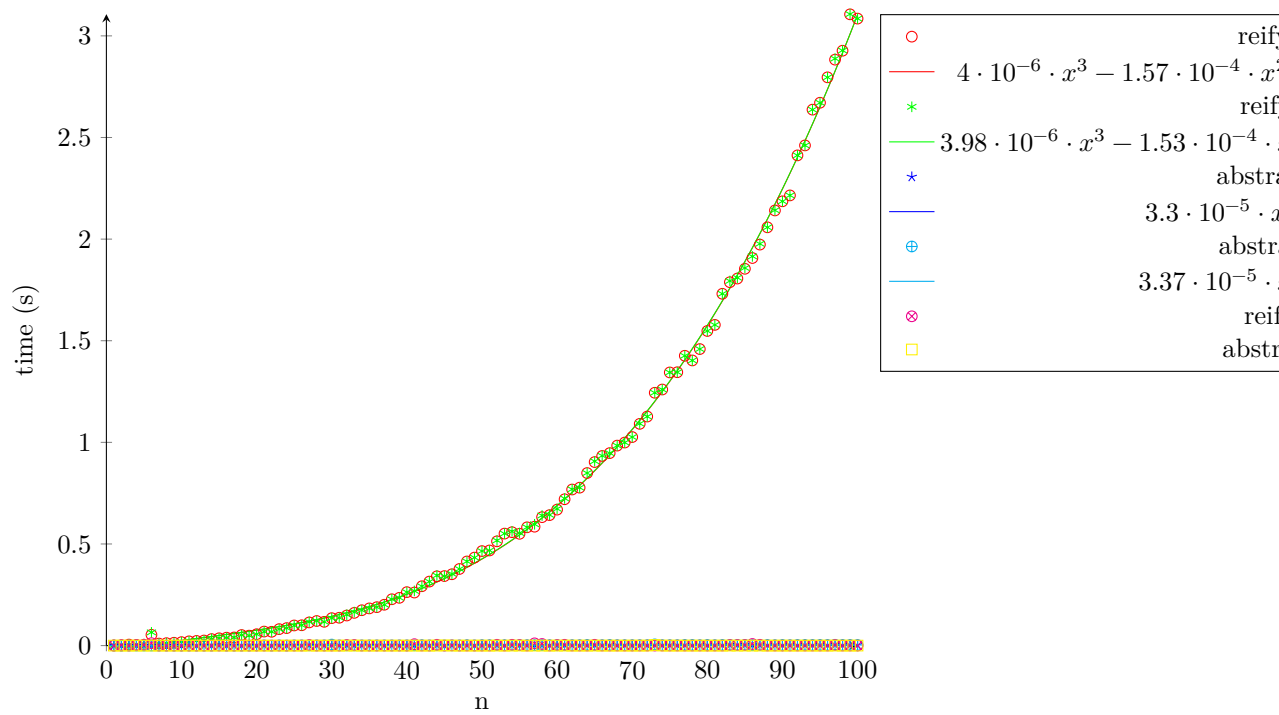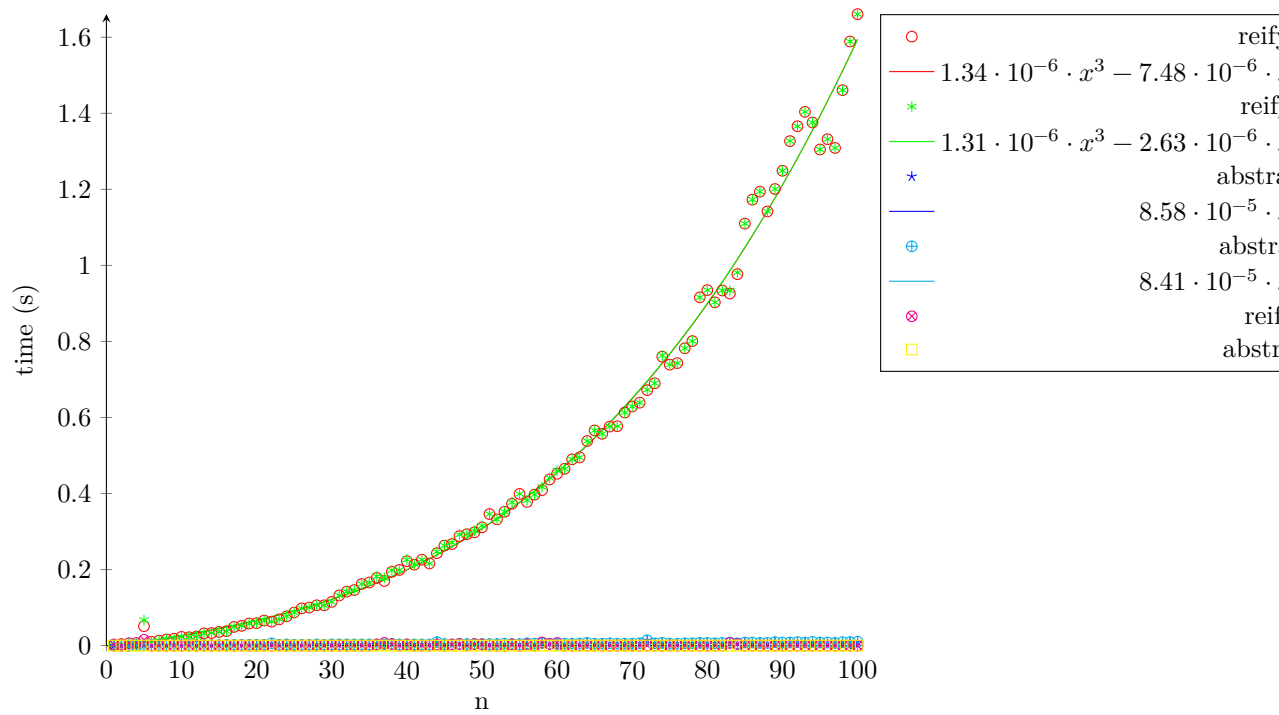
Figure 13: timing-typeclass-reification-let-in-HOAS

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