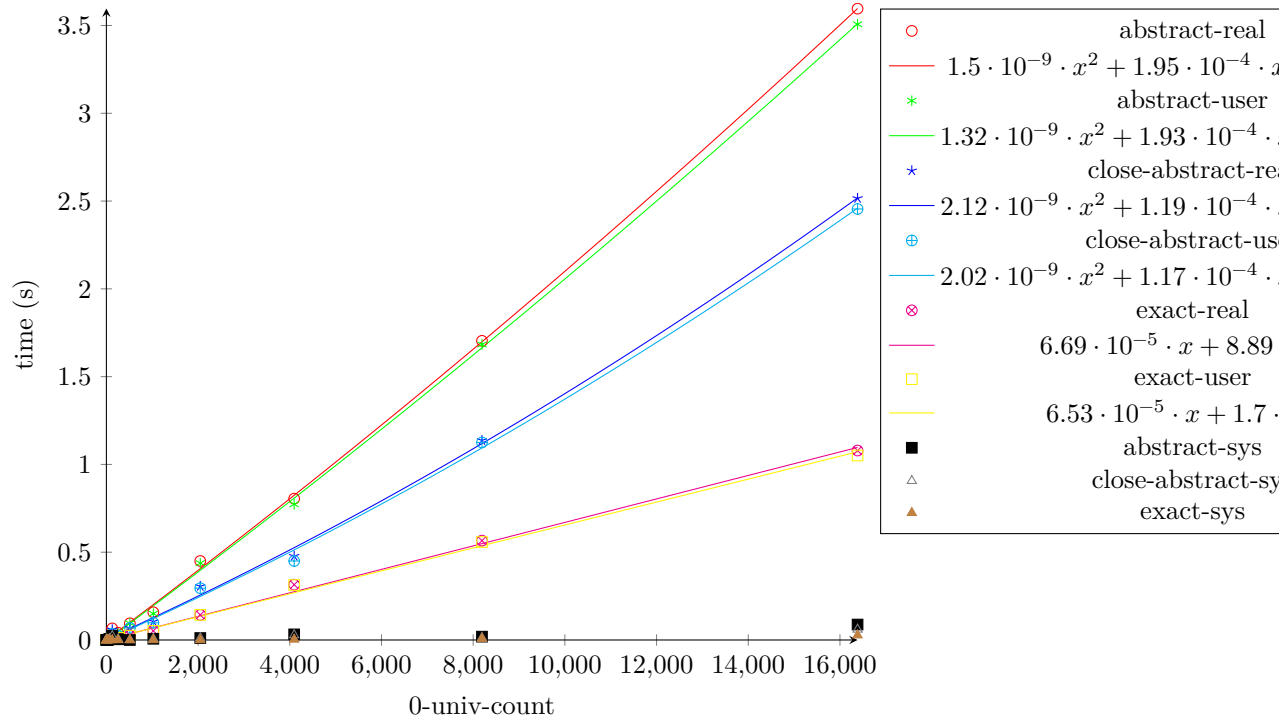Figure 1: timing-pattern

1

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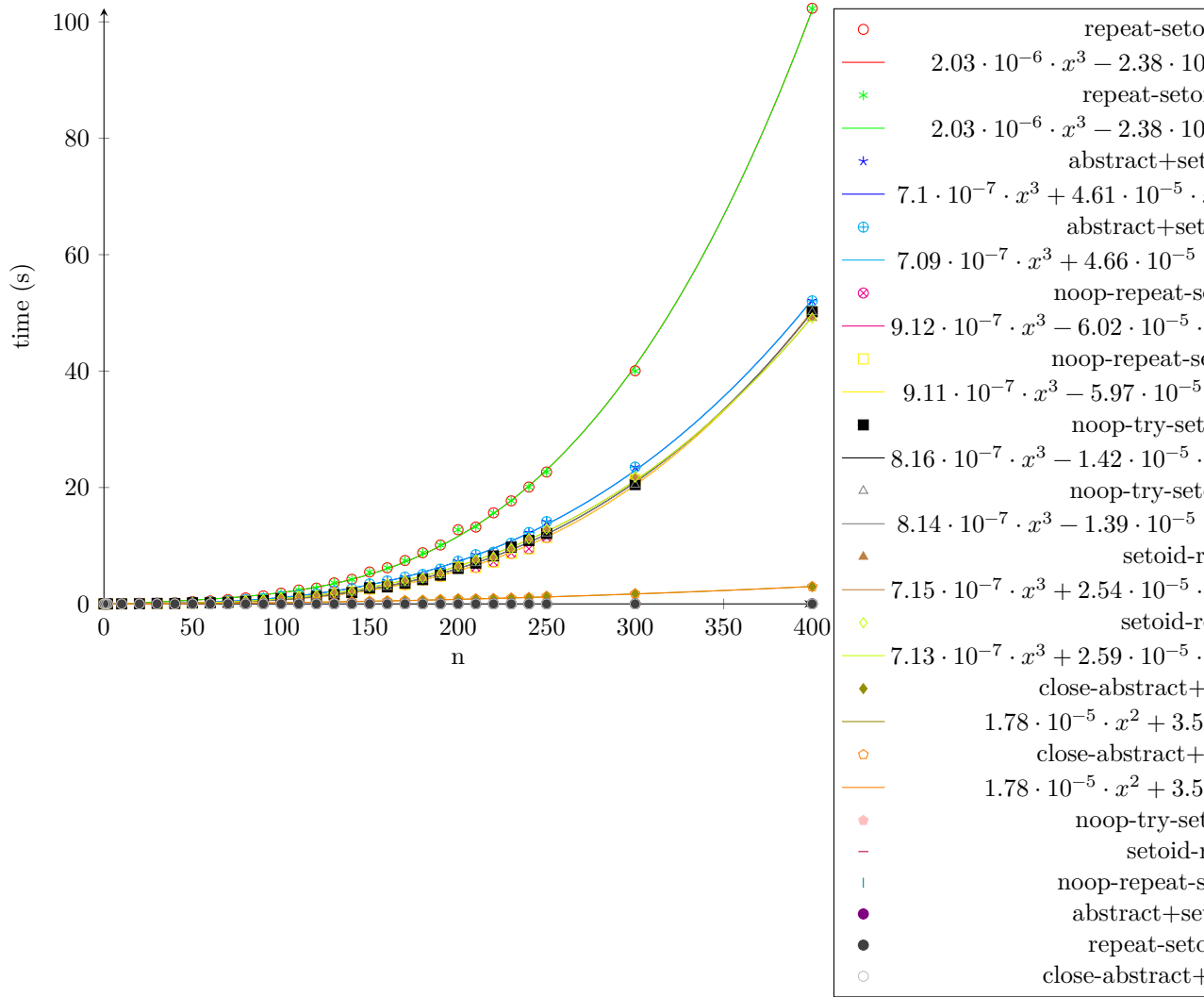
Figure 3: timing-repeat-setoid-rewrite-under-binders
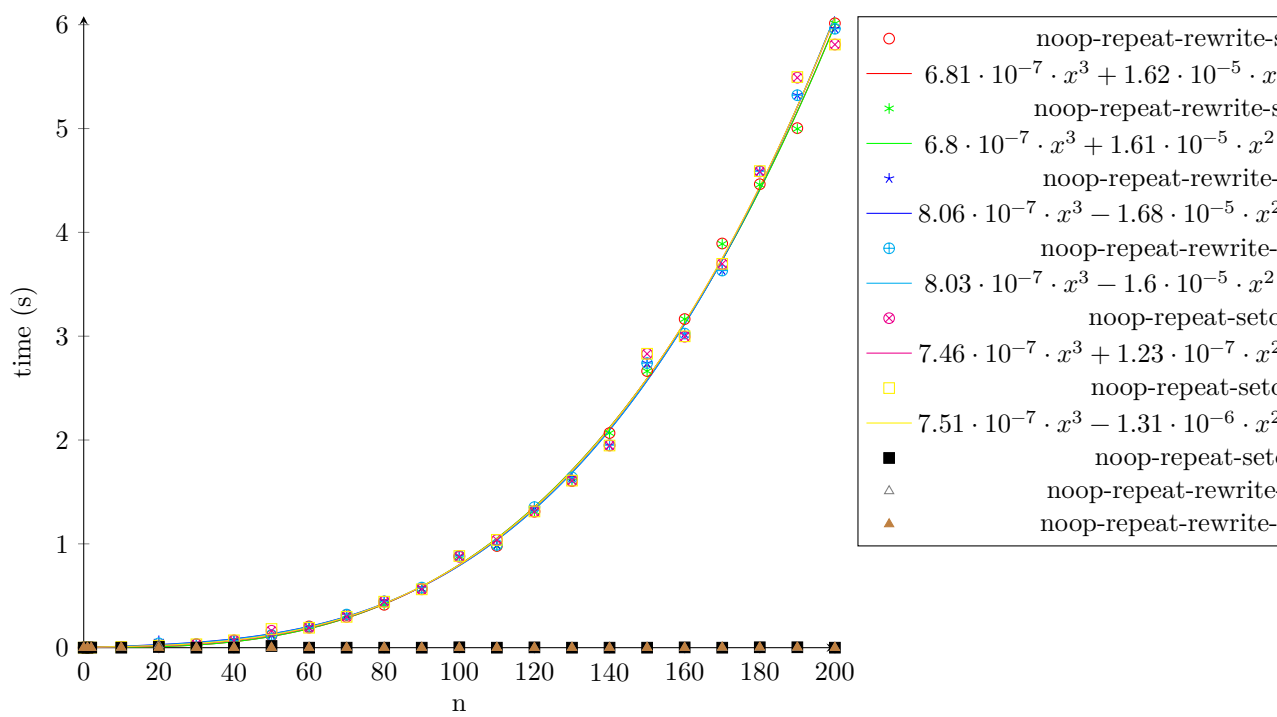
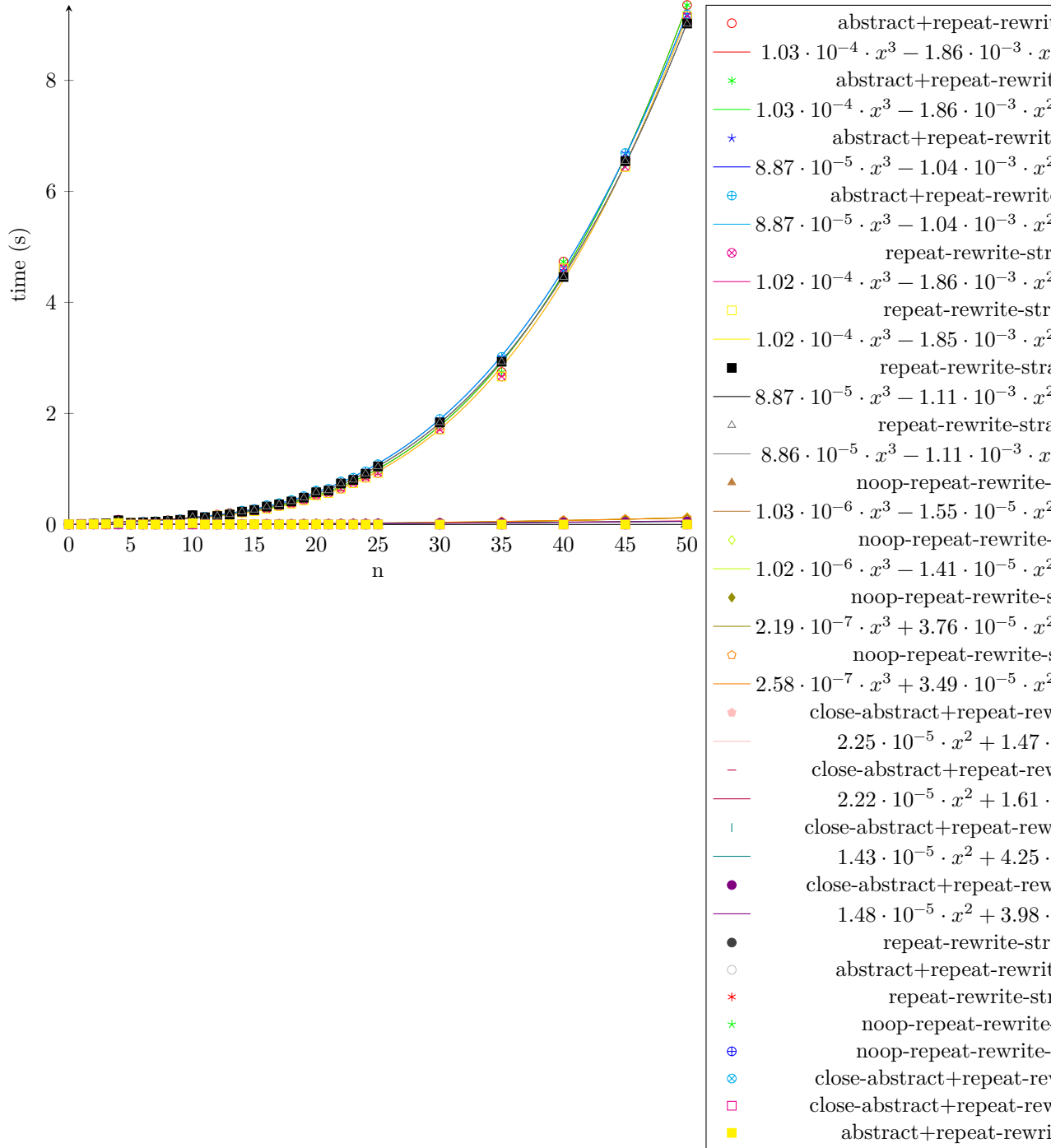Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

4

time (s)

8

6

4

2

0

0   5   10   15   20   25   30   35   40   45   50

n

abstract+repeat-rewri
$1.03 \cdot 10^{-4} \cdot x^3 - 1.86 \cdot 10^{-3} \cdot x$
abstract+repeat-rewrit
$1.03 \cdot 10^{-4} \cdot x^3 - 1.86 \cdot 10^{-3} \cdot x^2$
abstract+repeat-rewrit
$8.87 \cdot 10^{-5} \cdot x^3 - 1.04 \cdot 10^{-3} \cdot x^2$
abstract+repeat-rewrit
$8.87 \cdot 10^{-5} \cdot x^3 - 1.04 \cdot 10^{-3} \cdot x^2$
repeat-rewrite-str
$1.02 \cdot 10^{-4} \cdot x^3 - 1.86 \cdot 10^{-3} \cdot x^2$
repeat-rewrite-stra
$1.02 \cdot 10^{-4} \cdot x^3 - 1.85 \cdot 10^{-3} \cdot x^2$
repeat-rewrite-stra
$8.87 \cdot 10^{-5} \cdot x^3 - 1.11 \cdot 10^{-3} \cdot x^2$
repeat-rewrite-stra
$8.86 \cdot 10^{-5} \cdot x^3 - 1.11 \cdot 10^{-3} \cdot x$
noop-repeat-rewrite-
$1.03 \cdot 10^{-6} \cdot x^3 - 1.55 \cdot 10^{-5} \cdot x^2$
noop-repeat-rewrite-
$1.02 \cdot 10^{-6} \cdot x^3 - 1.41 \cdot 10^{-5} \cdot x^2$
noop-repeat-rewrite-s
$2.19 \cdot 10^{-7} \cdot x^3 + 3.76 \cdot 10^{-5} \cdot x^2$
noop-repeat-rewrite-s
$2.58 \cdot 10^{-7} \cdot x^3 + 3.49 \cdot 10^{-5} \cdot x^2$
close-abstract+repeat-rew
$2.25 \cdot 10^{-5} \cdot x^2 + 1.47 \cdot$
close-abstract+repeat-rew
$2.22 \cdot 10^{-5} \cdot x^2 + 1.61 \cdot$
close-abstract+repeat-rew
$1.43 \cdot 10^{-5} \cdot x^2 + 4.25 \cdot$
close-abstract+repeat-rew
$1.48 \cdot 10^{-5} \cdot x^2 + 3.98 \cdot$
repeat-rewrite-str
abstract+repeat-rewrit
repeat-rewrite-str
noop-repeat-rewrite-
noop-repeat-rewrite-
close-abstract+repeat-rev
close-abstract+repeat-rev
abstract+repeat-rewri

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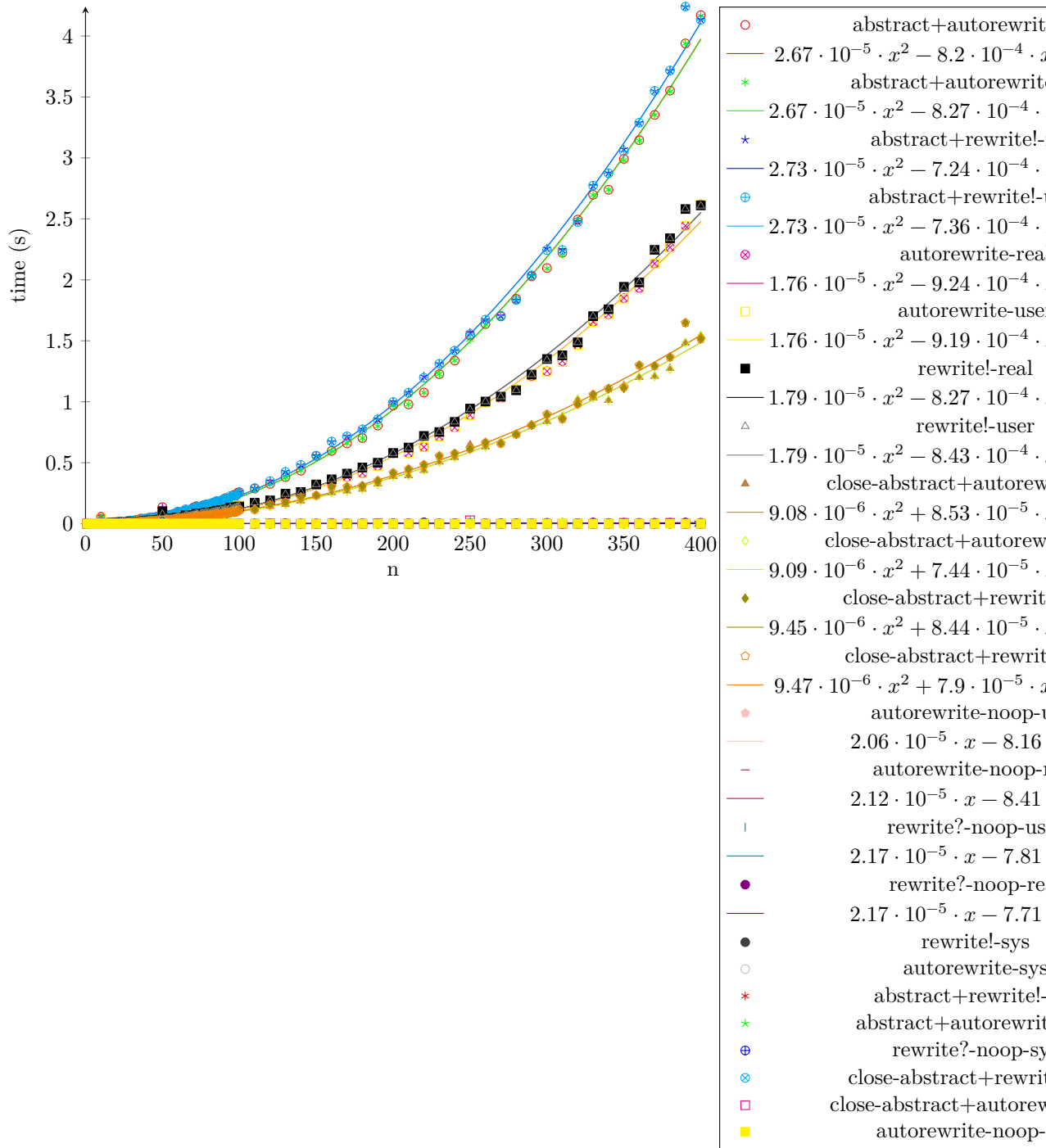
Figure 6: timing-rewrite-repeated-app-autorewrite

time (s)

n

try-rewrite?-noop-u

$3.22 \cdot 10^{-8} \cdot x^2 + 4.09 \cdot 10^{-5} \cdot$

try-rewrite?-noop-

$3.22 \cdot 10^{-8} \cdot x^2 + 4.1 \cdot 10^{-5} \cdot x$

try-rewrite-noop-

$3.19 \cdot 10^{-8} \cdot x^2 + 4.16 \cdot 10^{-5} \cdot$

try-rewrite-noop-u

$3.19 \cdot 10^{-8} \cdot x^2 + 4.13 \cdot 10^{-5} \cdot$

autorewrite-noop-u

$3.07 \cdot 10^{-8} \cdot x^2 + 4.86 \cdot 10^{-5} \cdot$

autorewrite-noop-

$3.07 \cdot 10^{-8} \cdot x^2 + 4.89 \cdot 10^{-5} \cdot$

try-rewrite!-noop-

$3.1 \cdot 10^{-8} \cdot x^2 + 4.78 \cdot 10^{-5} \cdot x$

try-rewrite!-noop-u

$3.1 \cdot 10^{-8} \cdot x^2 + 4.78 \cdot 10^{-5} \cdot x$

try-ssr-rewrite-noop

$3.86 \cdot 10^{-7} \cdot x - 1.84$

try-ssr-rewrite-noop

$3.86 \cdot 10^{-7} \cdot x - 1.84$

try-ssr-rewrite!-noop

$4.37 \cdot 10^{-7} \cdot x - 9.9 \cdot$

try-ssr-rewrite!-noop

$4.5 \cdot 10^{-7} \cdot x - 1.16 \cdot$

try-ssr-rewrite?-noop

$3.73 \cdot 10^{-7} \cdot x - 1.75$

try-ssr-rewrite?-noop

$3.73 \cdot 10^{-7} \cdot x - 1.75$

try-rewrite!-noop-

try-ssr-rewrite?-noo

try-ssr-rewrite-noop

try-ssr-rewrite!-noop

try-rewrite?-noop-

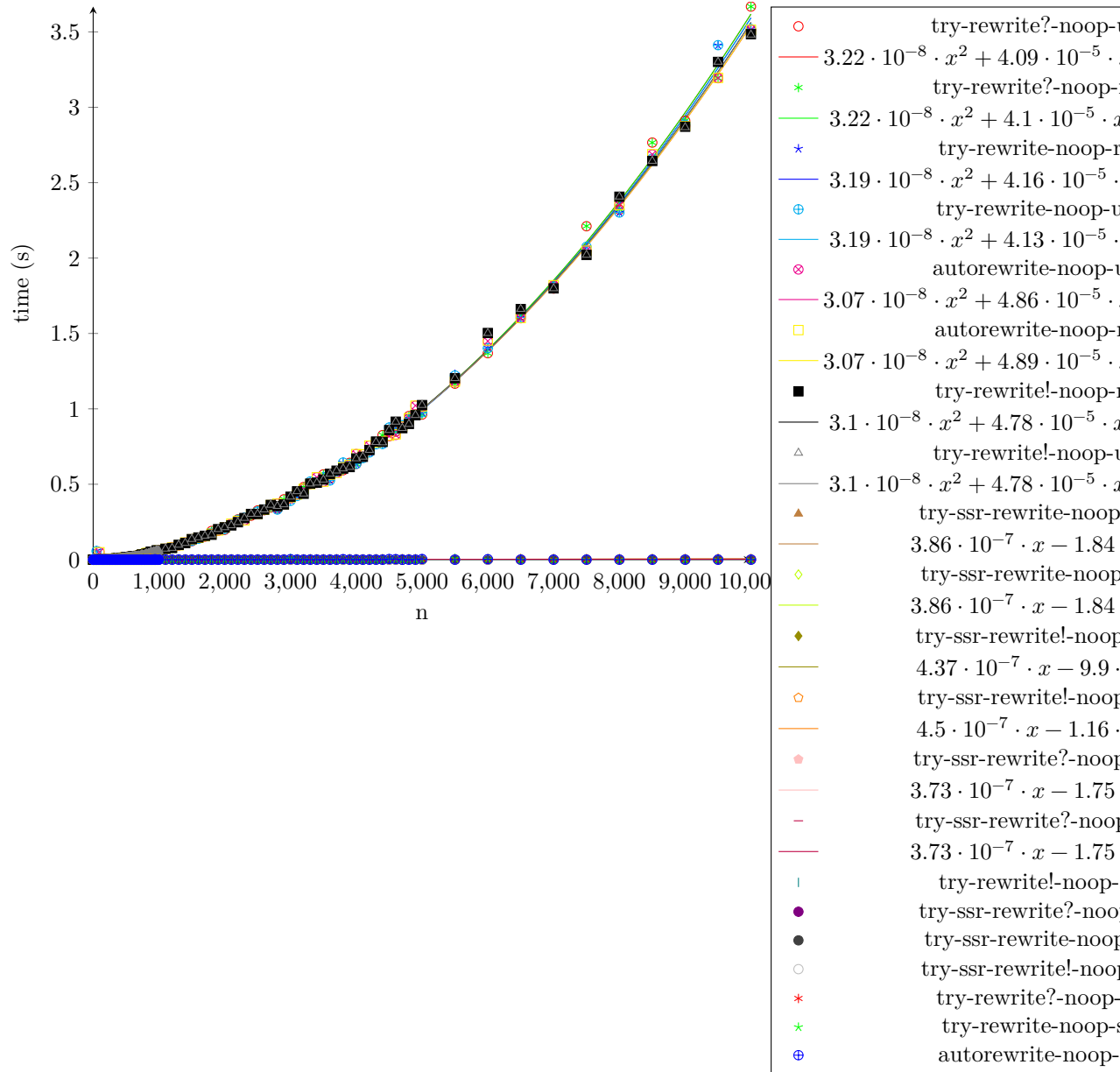try-rewrite-noop-s

autorewrite-noop-

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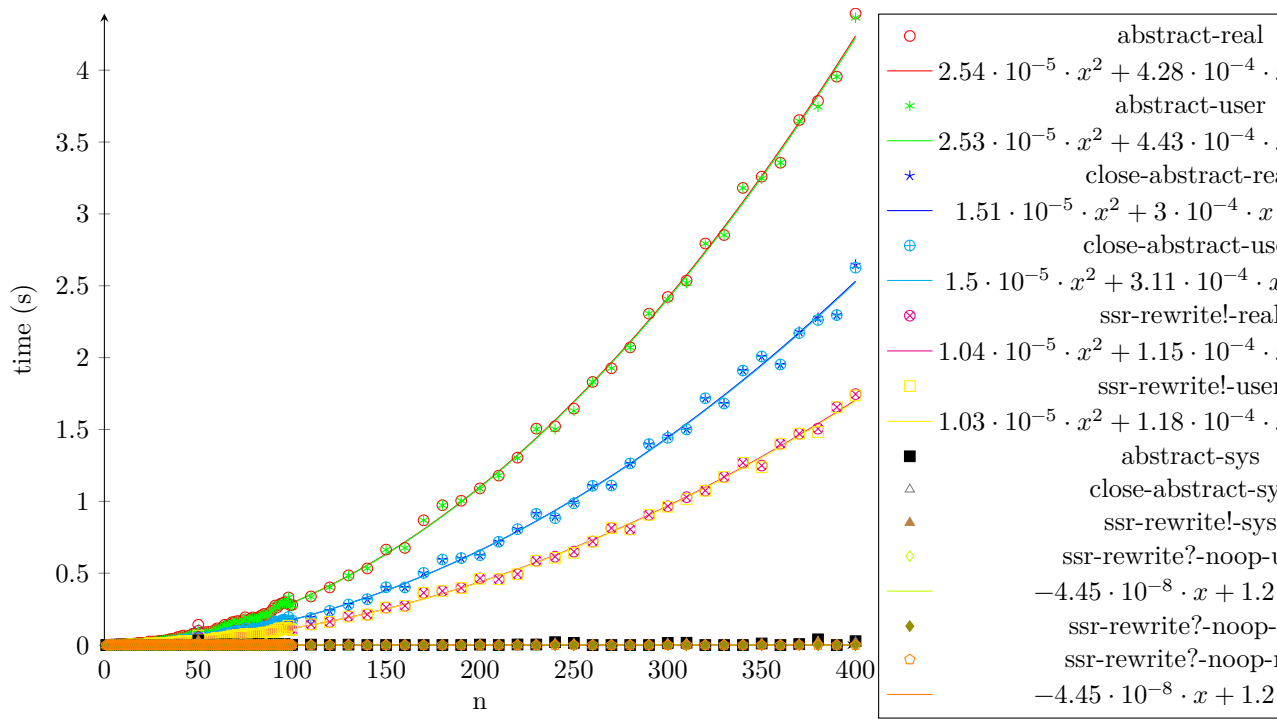
7

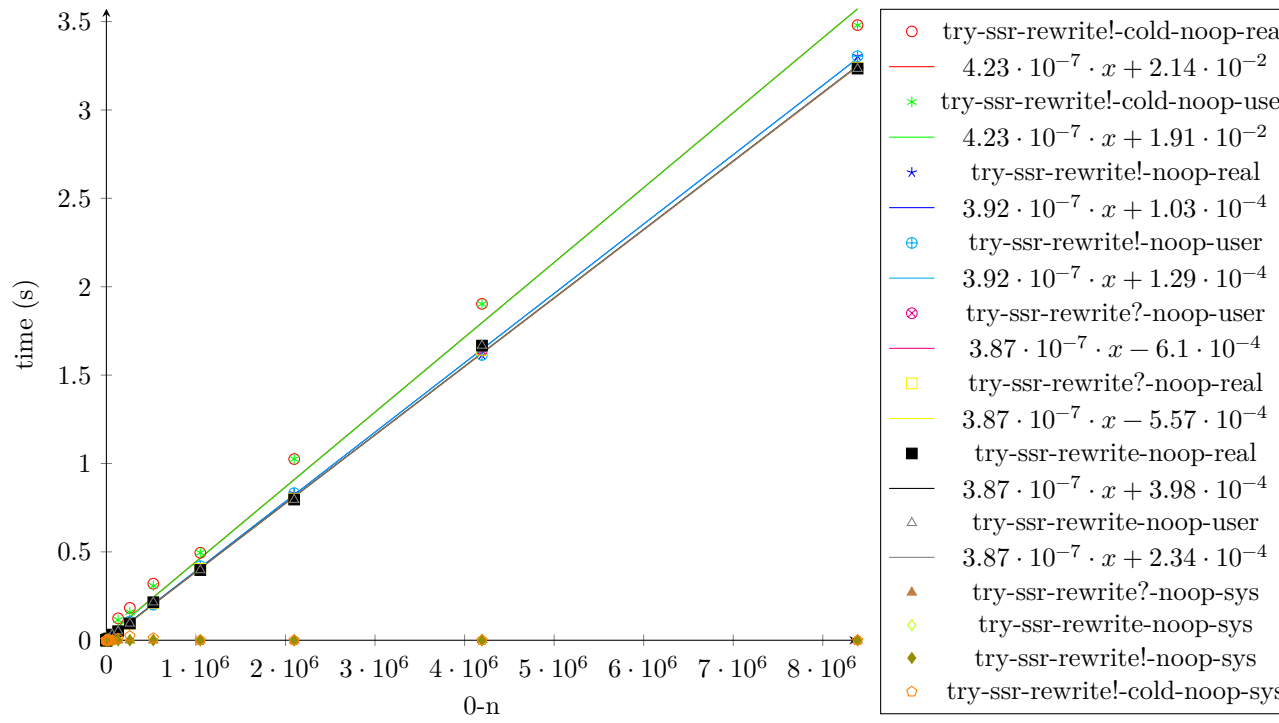Figure 8: timing-rewrite-repeated-app-ssrrewrite

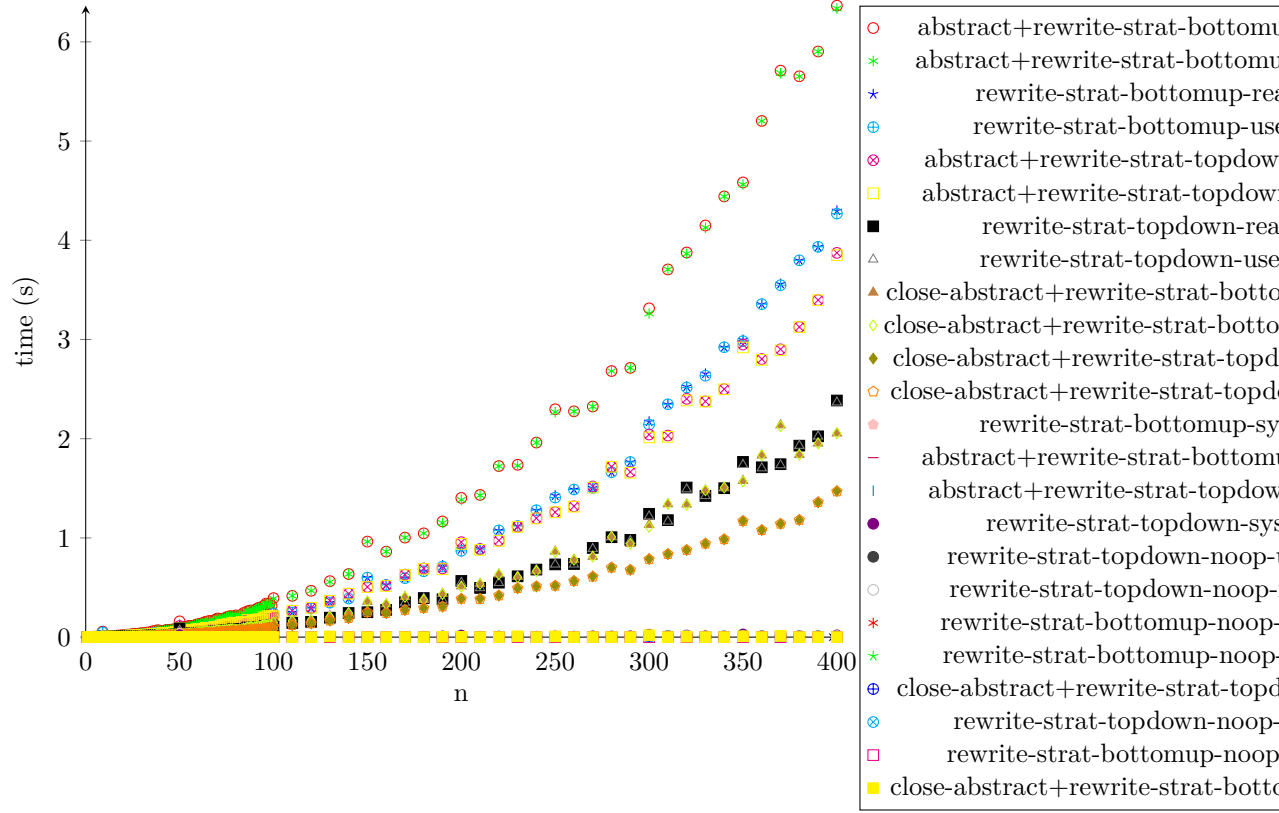Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

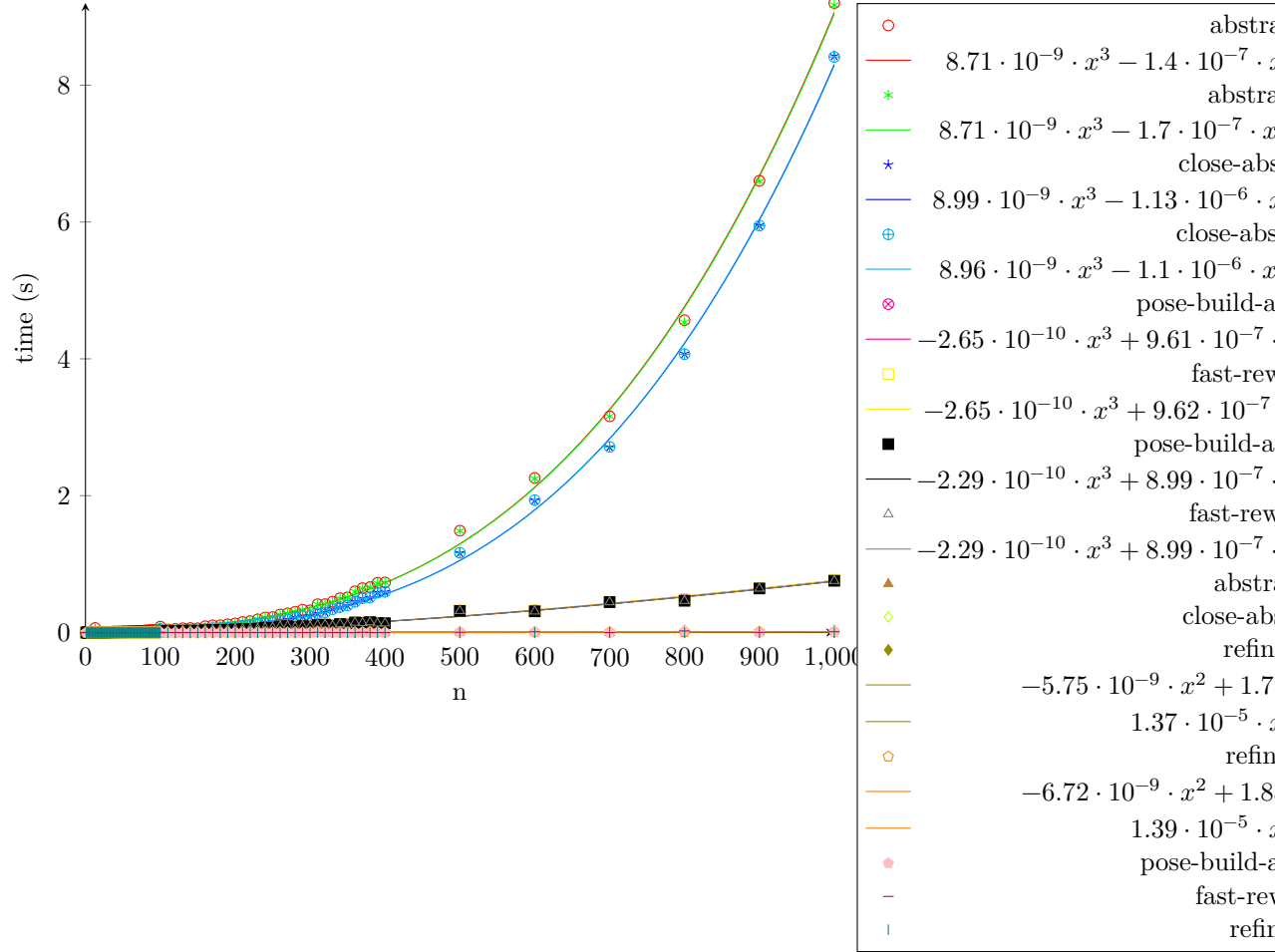Figure 10: timing-rewrite-repeated-app-rewrite-strat

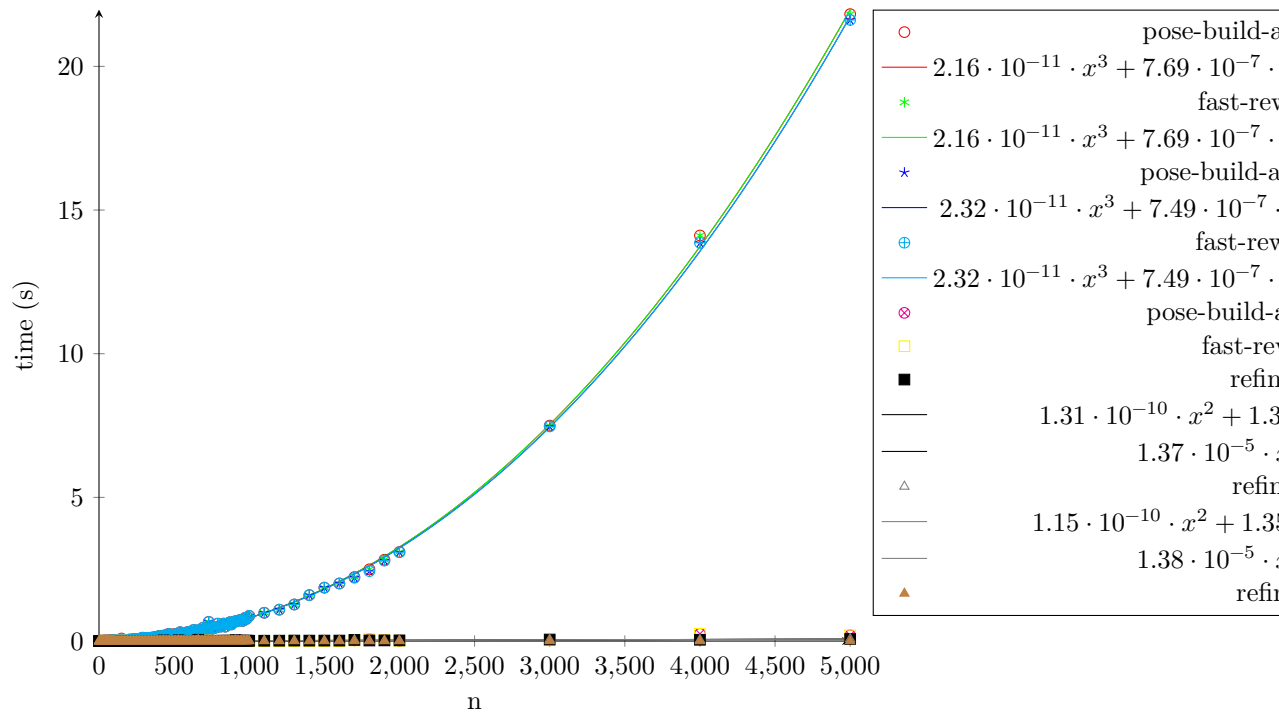Figure 11: timing-rewrite-repeated-app-fast-rewrite

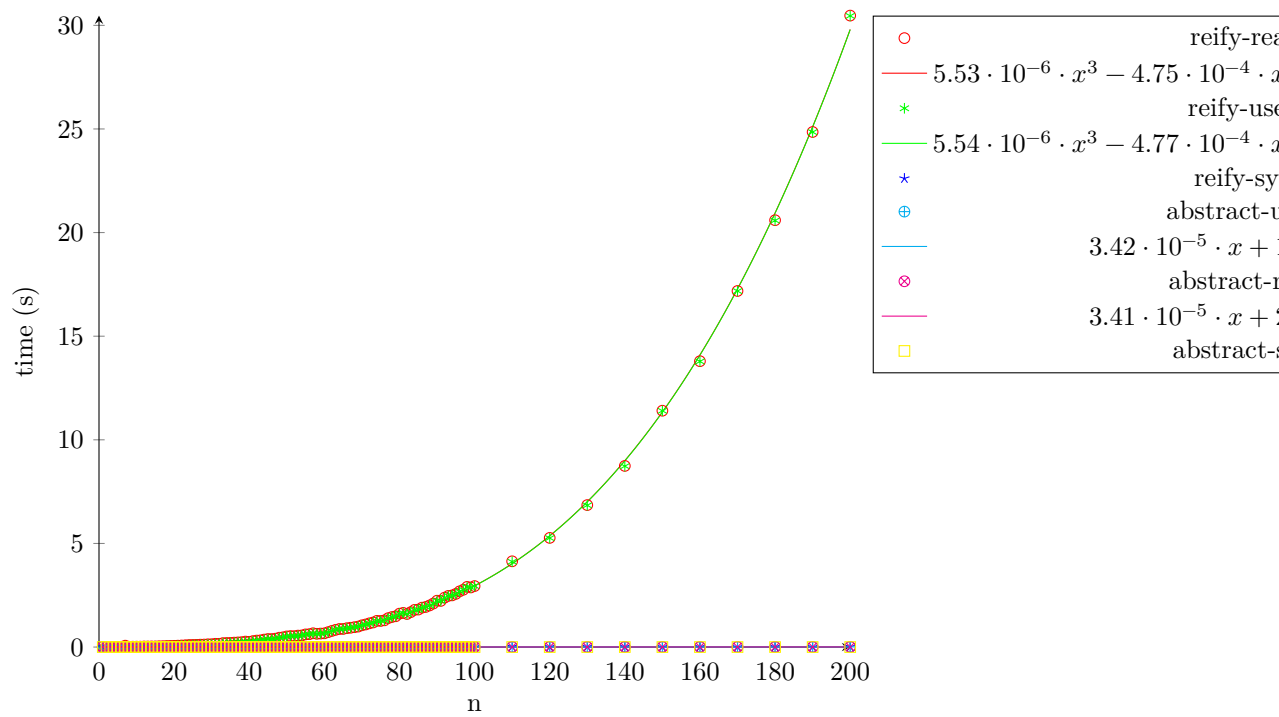Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract
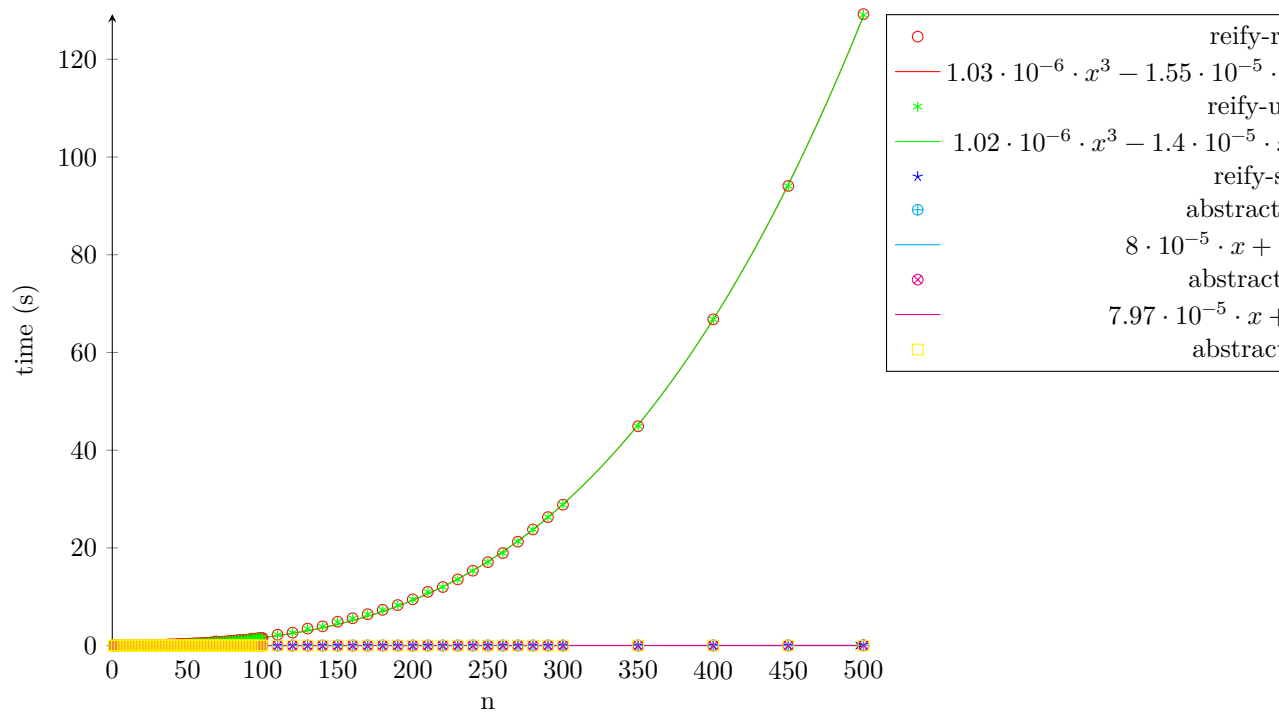
Figure 13: timing-typeclass-reification-let-in-HOAS

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

time (s)

n

18
16
14
12
10
8
6
4
2
0

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

abstract-real
$2.05 \cdot 10^{-6} \cdot x^2 - 1.28 \cdot 10^{-5} \cdot x$
abstract-user
$2.06 \cdot 10^{-6} \cdot x^2 - 1.64 \cdot 10^{-5} \cdot x$
fast-rewrite-real
$1.72 \cdot 10^{-6} \cdot x^2 - 4.24 \cdot 10^{-5} \cdot x$
fast-rewrite-user
$1.72 \cdot 10^{-6} \cdot x^2 - 4.64 \cdot 10^{-5} \cdot x$
close-abstract-real
$3.31 \cdot 10^{-7} \cdot x^2 + 2.81 \cdot 10^{-5} \cdot x$
close-abstract-user
$3.31 \cdot 10^{-7} \cdot x^2 + 2.84 \cdot 10^{-5} \cdot x$
refine-user
$2.55 \cdot 10^{-7} \cdot x^2 - 2.89 \cdot 10^{-5} \cdot x$
$5 \cdot 10^{-4} \cdot x - 5.52 \cdot 1$
refine-real
$2.54 \cdot 10^{-7} \cdot x^2 - 2.82 \cdot 10^{-5} \cdot x$
$5 \cdot 10^{-4} \cdot x - 5.52 \cdot 1$
check-pf-cast-real
$2.56 \cdot 10^{-7} \cdot x^2 - 5.72 \cdot 10^{-5} \cdot x$
check-pf-cast-user
$2.56 \cdot 10^{-7} \cdot x^2 - 5.72 \cdot 10^{-5} \cdot x$
type-admit-cast-user
$2.53 \cdot 10^{-7} \cdot x^2 - 5.34 \cdot 10^{-5} \cdot x$
type-admit-cast-real
$2.53 \cdot 10^{-7} \cdot x^2 - 5.34 \cdot 10^{-5} \cdot x$
type-pf-cast-real
$2.43 \cdot 10^{-7} \cdot x^2 - 1.7 \cdot 10^{-5} \cdot x$
type-pf-cast-user
$2.43 \cdot 10^{-7} \cdot x^2 - 1.7 \cdot 10^{-5} \cdot x$
check-admit-real
$2.41 \cdot 10^{-7} \cdot x^2 - 1.1 \cdot 10^{-5} \cdot x$
check-admit-user
$2.41 \cdot 10^{-7} \cdot x^2 - 1.12 \cdot 10^{-5} \cdot x$
type-admit-real
$2.44 \cdot 10^{-7} \cdot x^2 - 3.82 \cdot 10^{-5} \cdot x$
type-admit-user
$2.44 \cdot 10^{-7} \cdot x^2 - 3.8 \cdot 10^{-5} \cdot x$
check-admit-cast-user
$2.27 \cdot 10^{-7} \cdot x^2 + 1.04 \cdot 10^{-5} \cdot x$
check-admit-cast-real
$2.27 \cdot 10^{-7} \cdot x^2 + 1.08 \cdot 10^{-5} \cdot x$
build-eval-thunk-user
$1.01 \cdot 10^{-4} \cdot x - 6.05 \cdot$
build-eval-thunk-real
$1.02 \cdot 10^{-4} \cdot x - 5.42 \cdot$
build-thunk-user
$1 \cdot 10^{-4} \cdot x - 6.17 \cdot 1$
build-thunk-real
$1.01 \cdot 10^{-4} \cdot x - 5.56 \cdot$
check-L-user