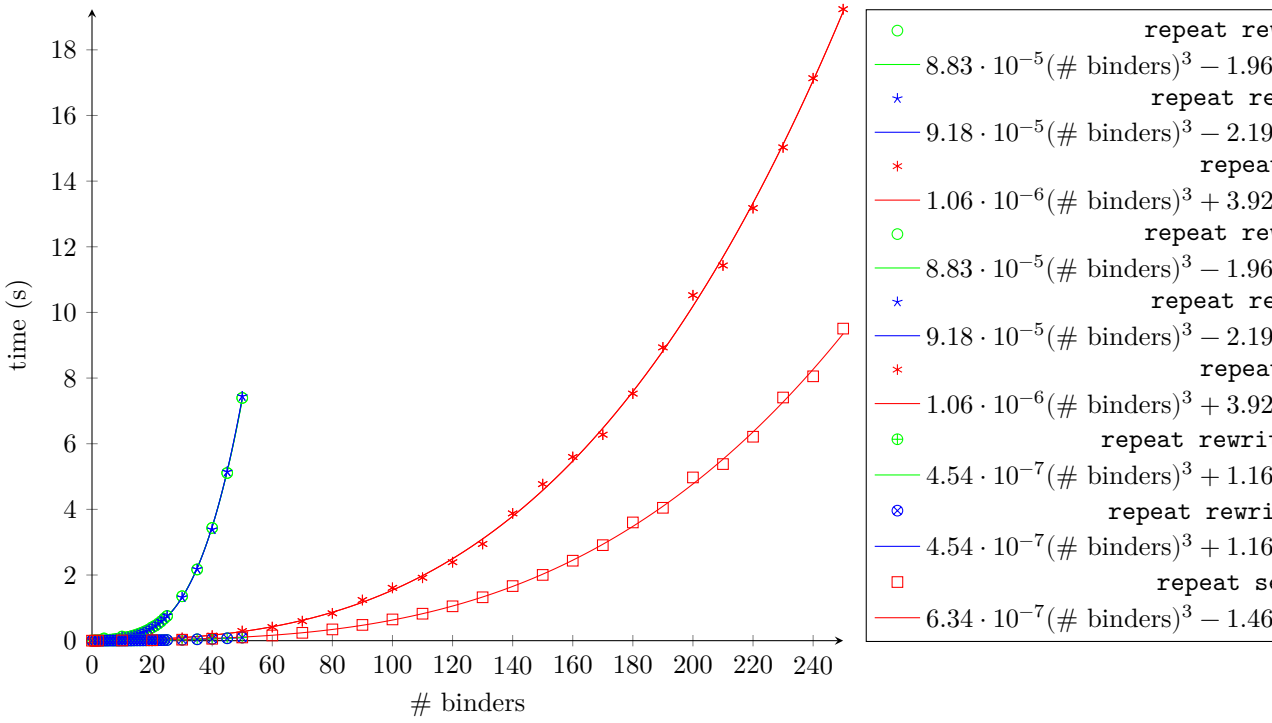


Figure 1: Timing of `rewrite_strat` and `setoid_rewrite` under binders

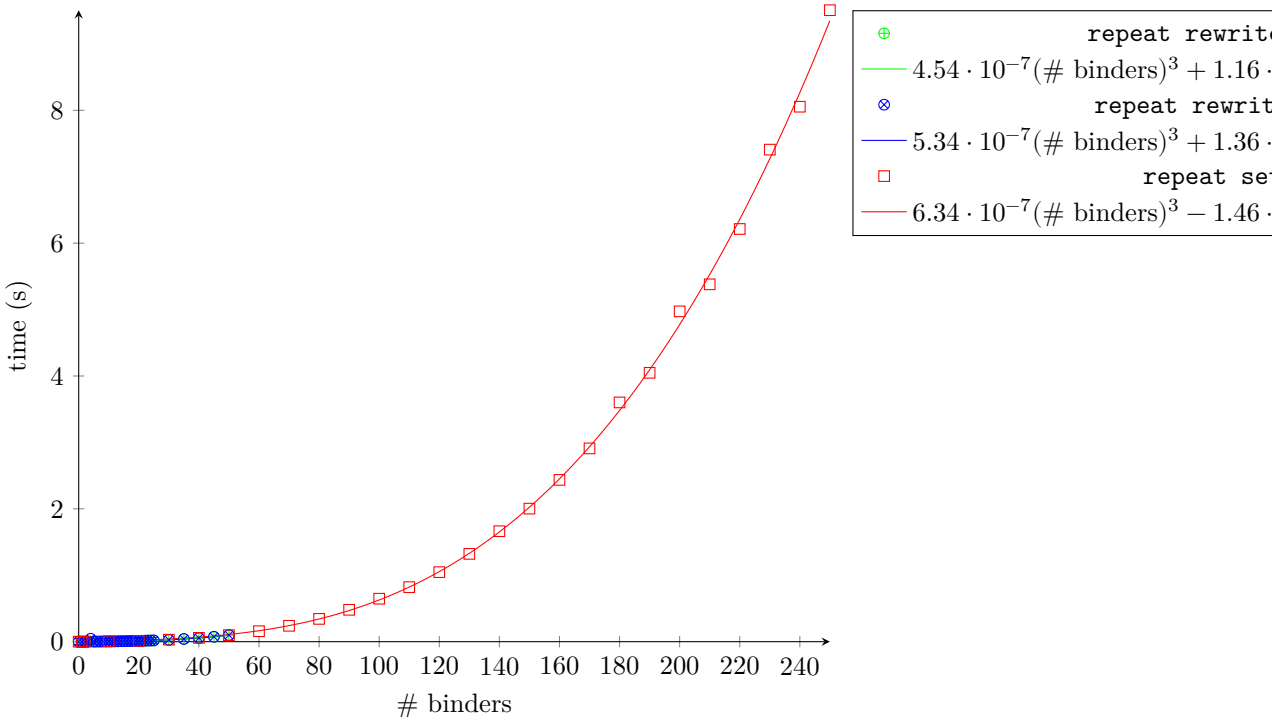


Figure 2: Timing of `rewrite_strat` and `setoid_rewrite` under binders

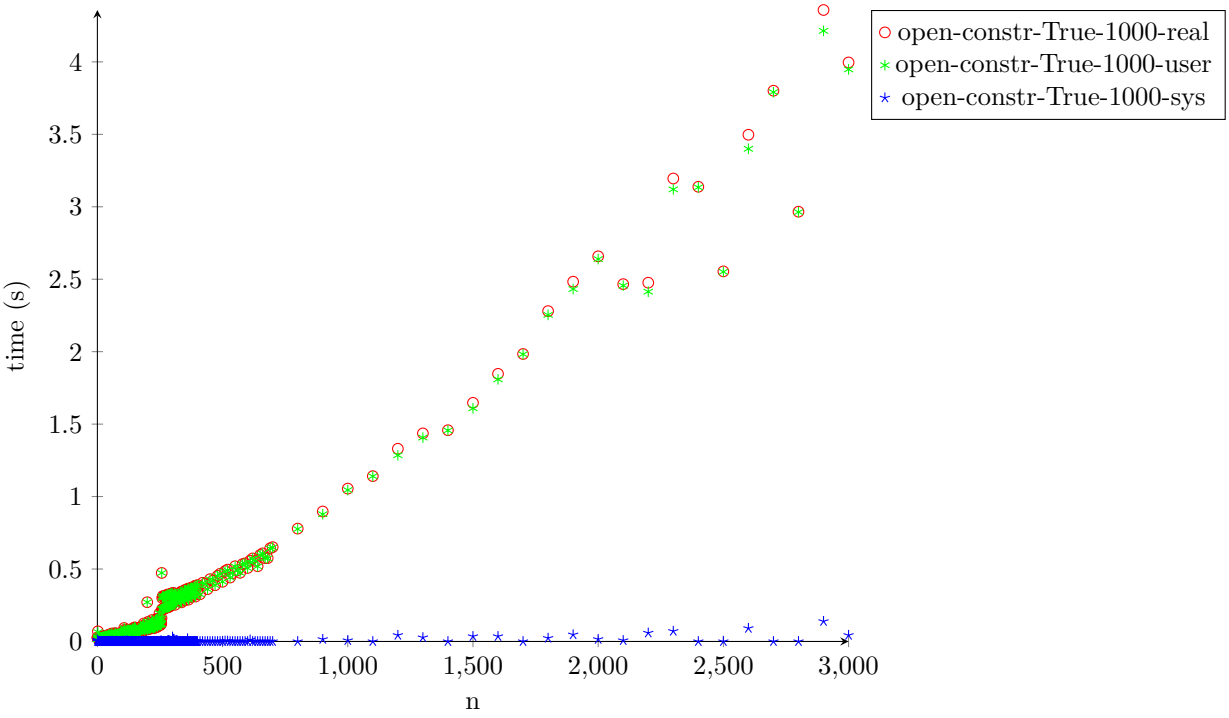


Figure 3: timing-do-n-open-constr-True

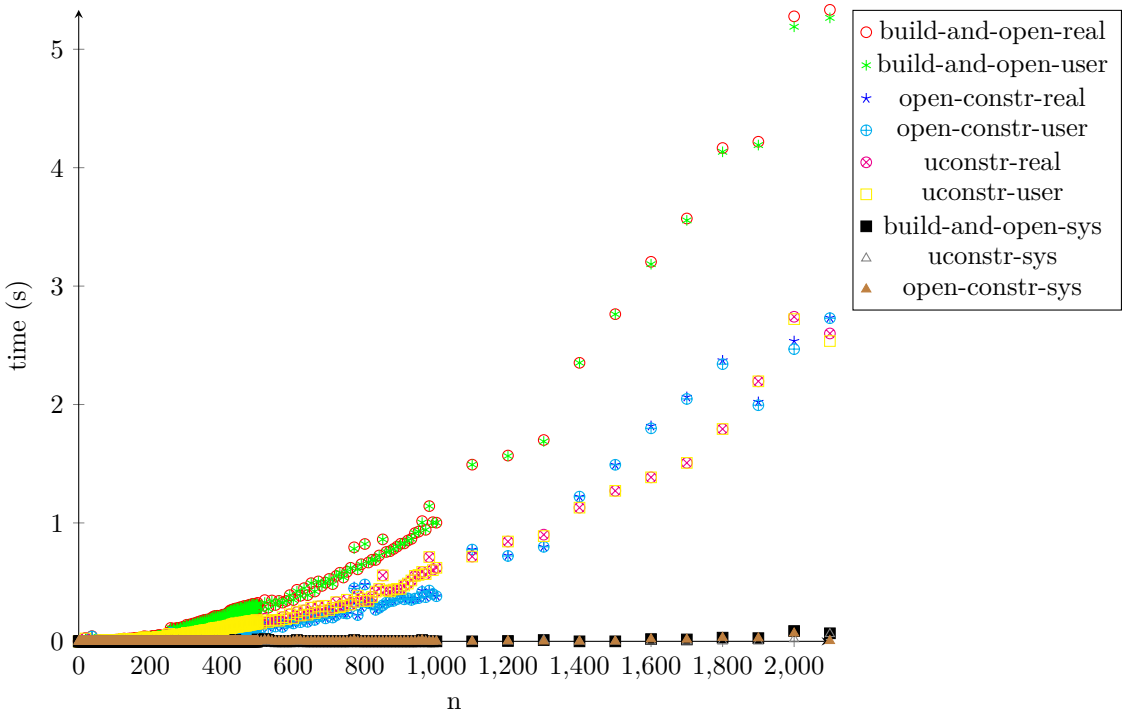


Figure 4: timing-open-constr-n-lambda-no-types-different-names

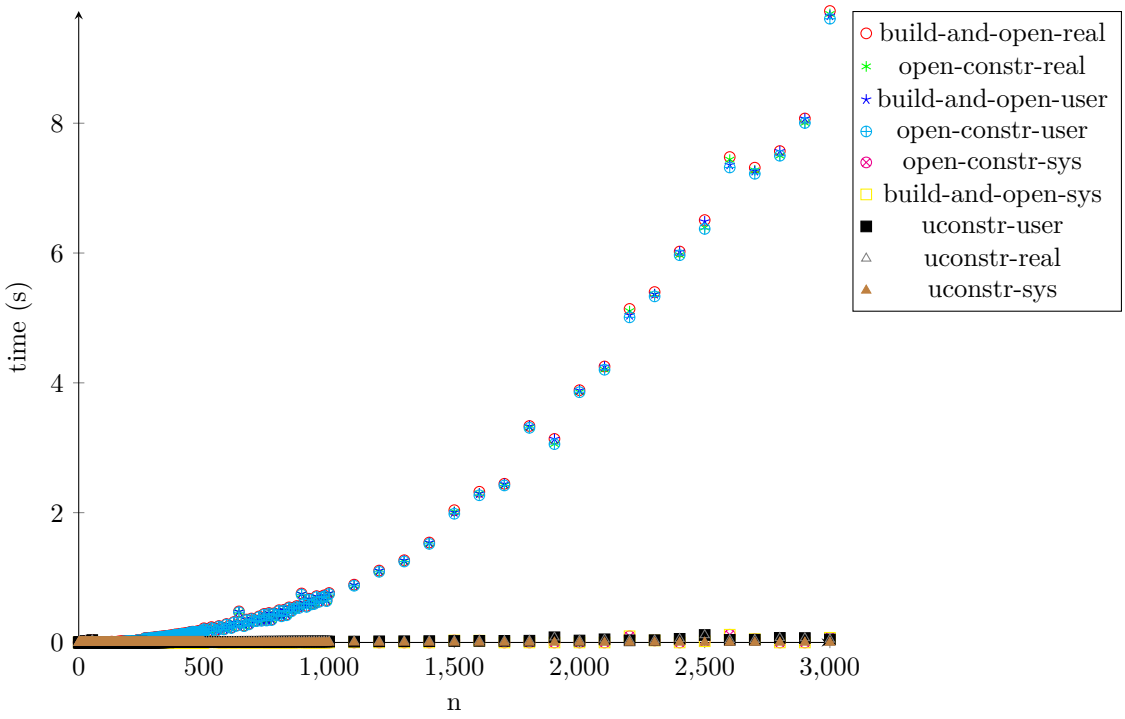


Figure 5: timing-open-constr-n-lambda-no-types-no-names

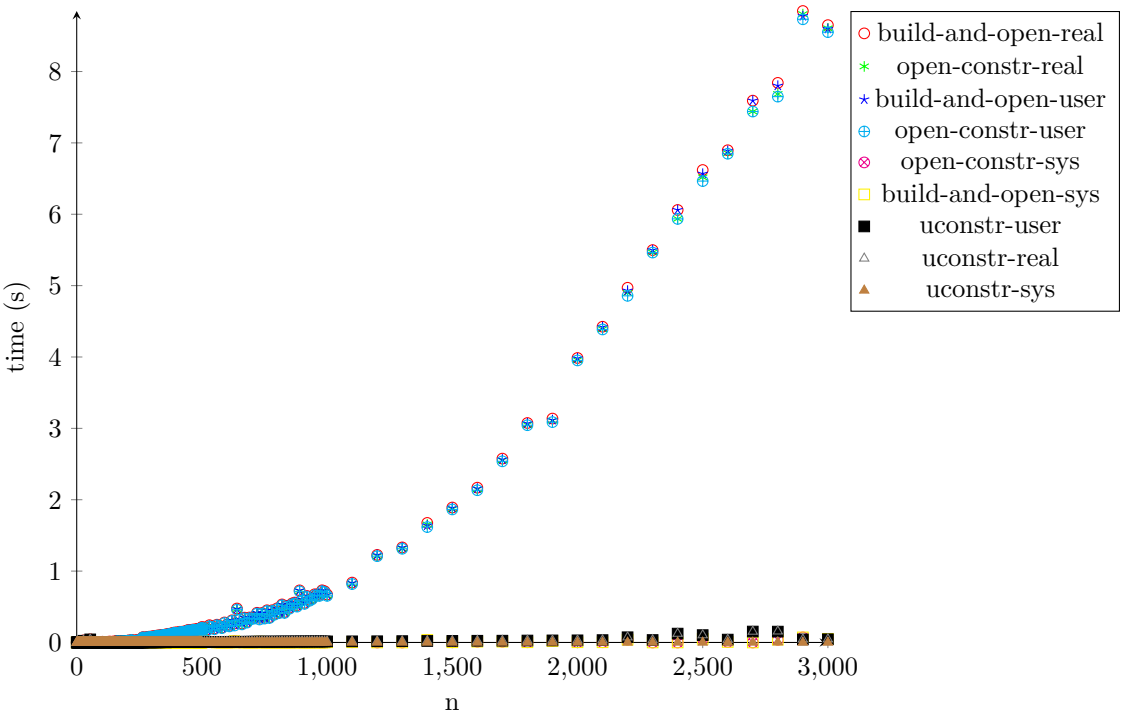


Figure 6: timing-open-constr-n-lambda-no-types-same-names

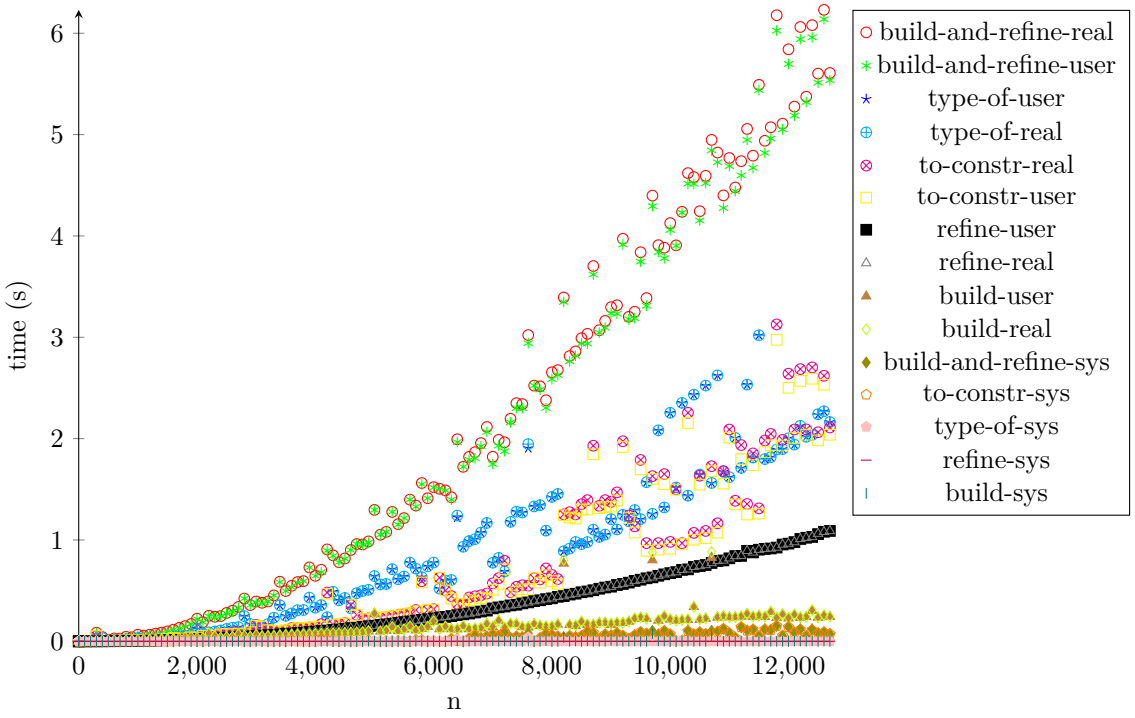


Figure 7: timing-app-n-uconstr

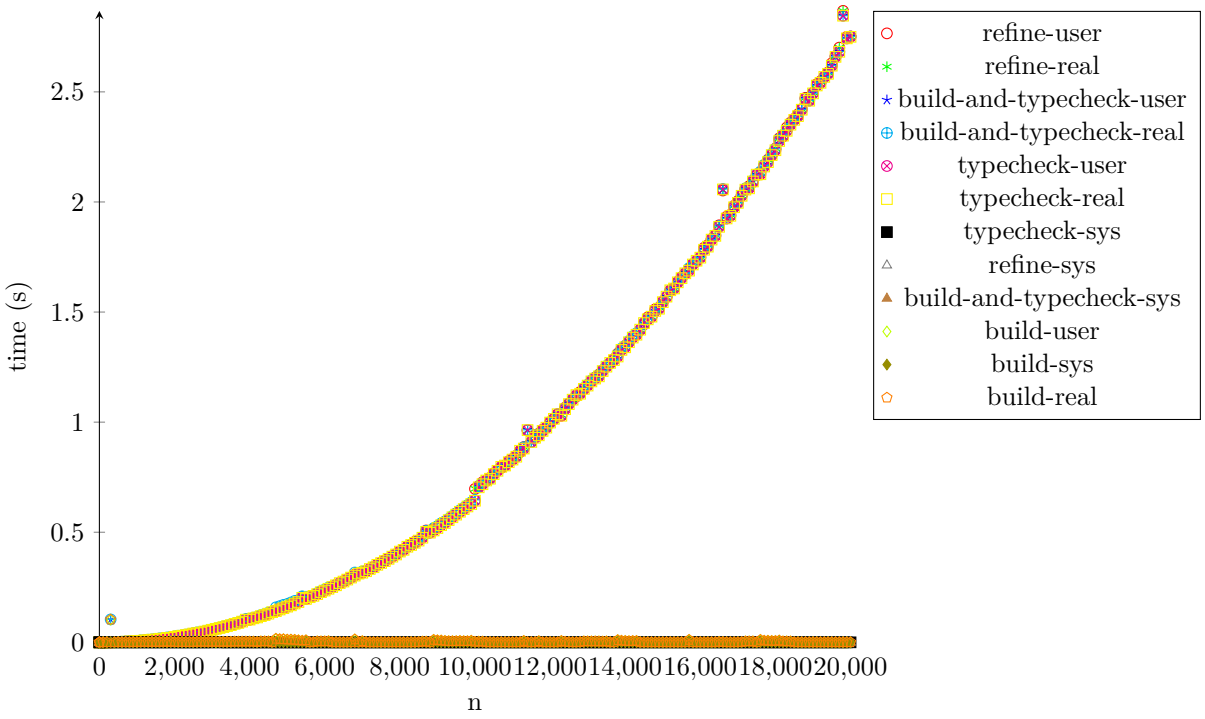


Figure 8: timing-app-n-ltac2

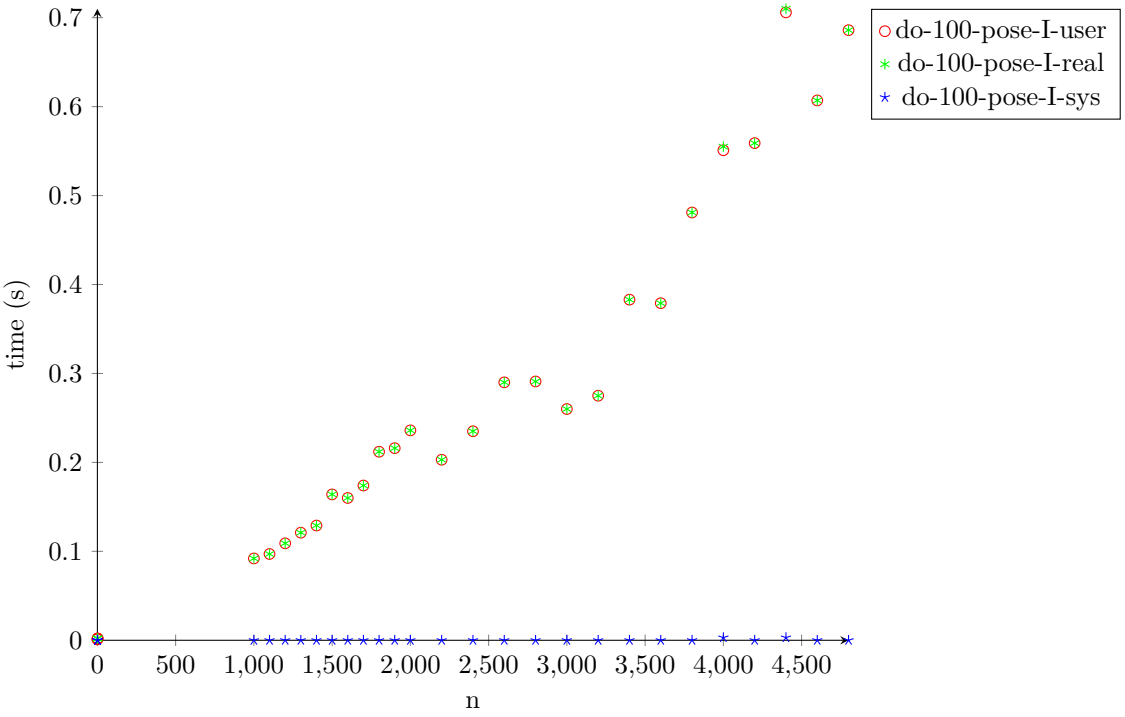


Figure 9: timing-do-n-pose

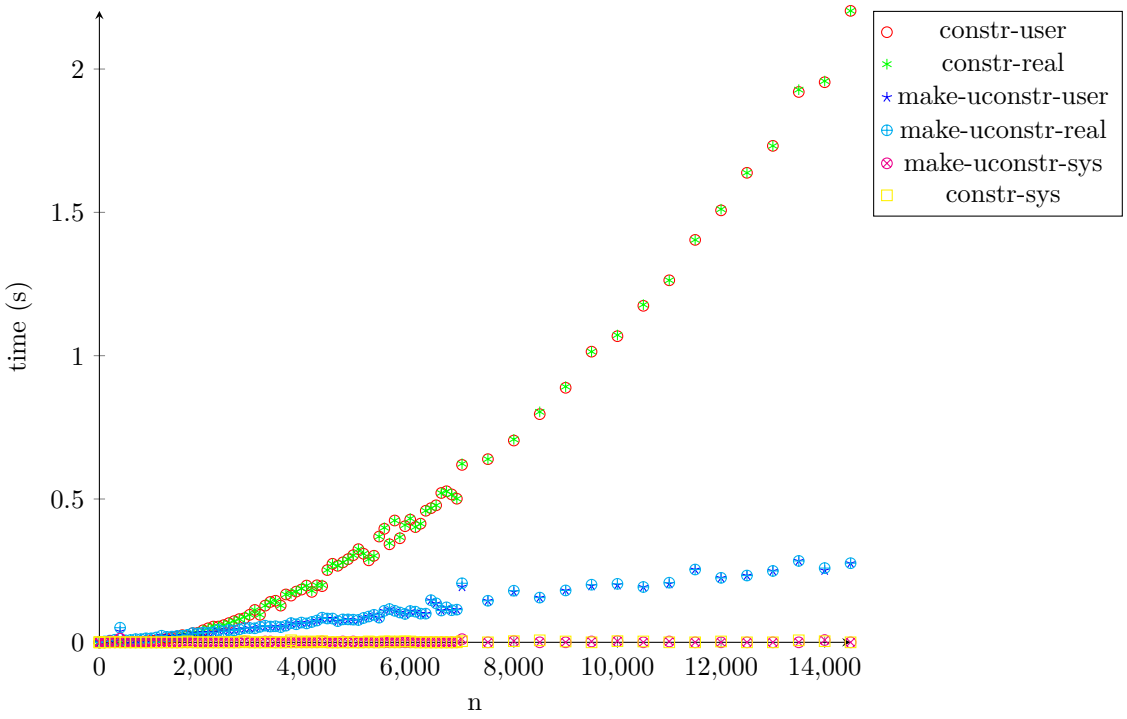


Figure 10: timing-let-n-uconstr

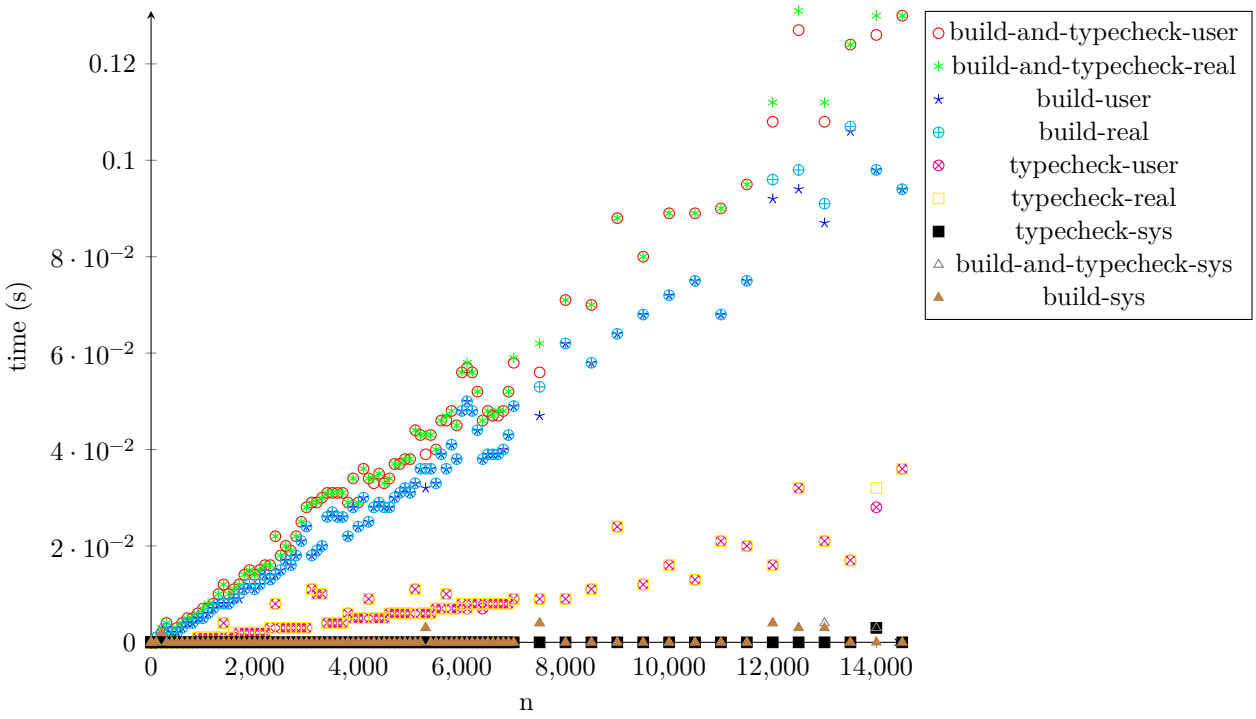


Figure 11: timing-let-n-ltac2

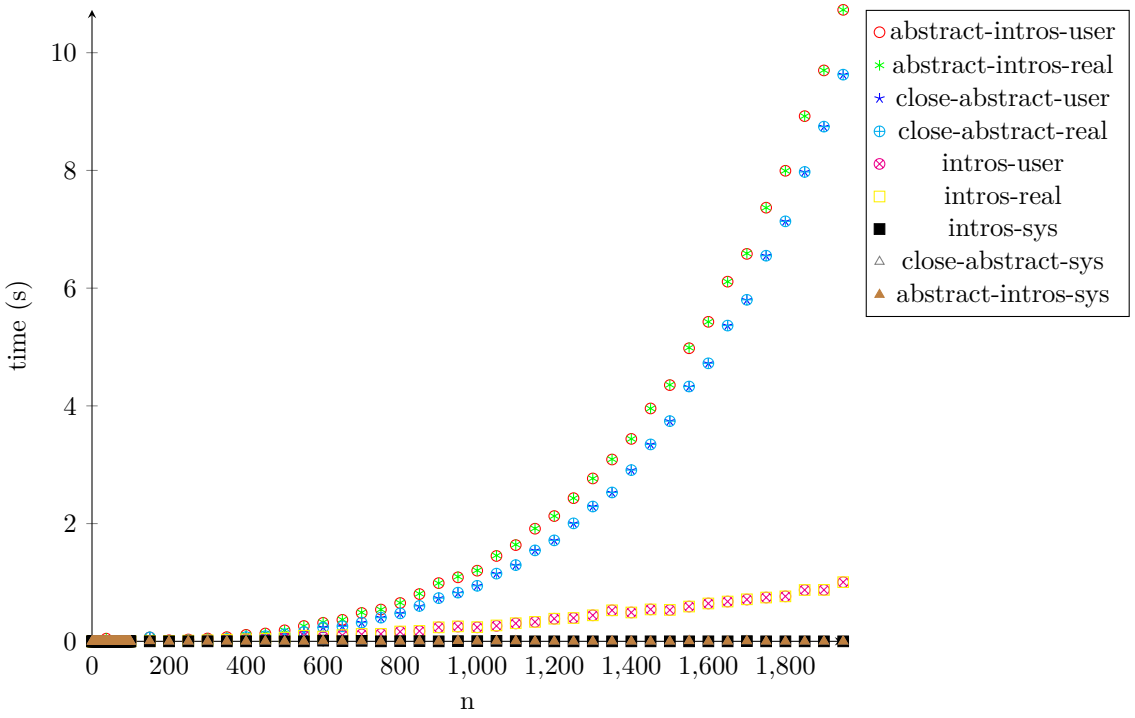


Figure 12: timing-intros-n-let

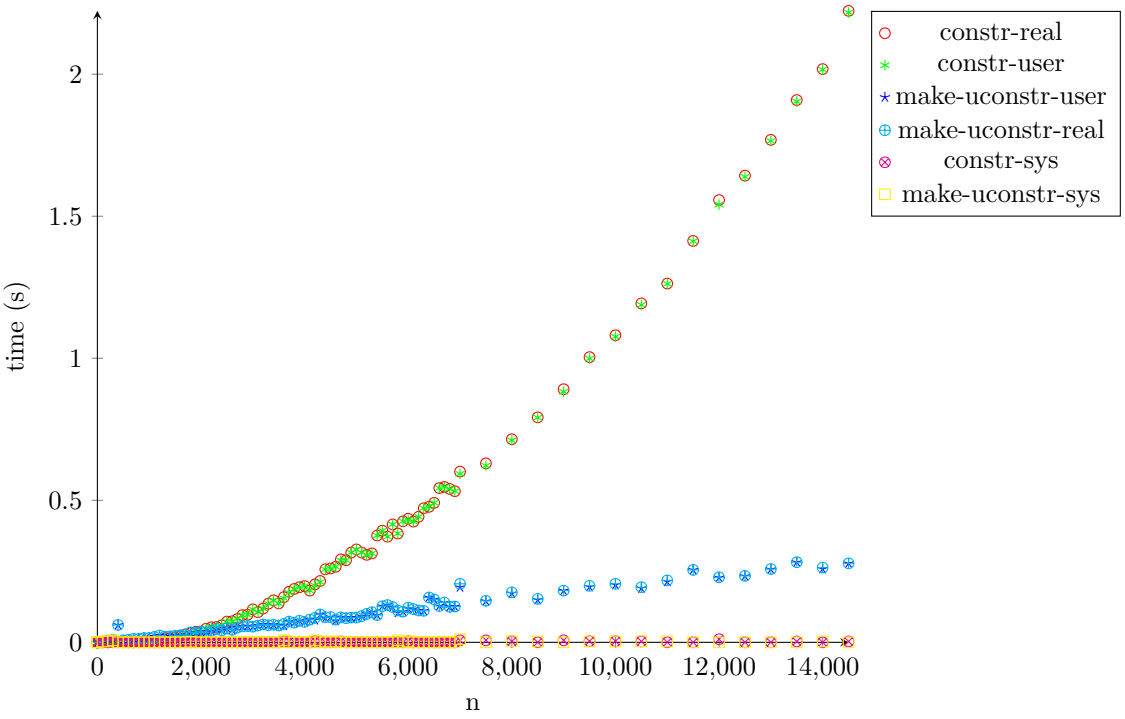


Figure 13: timing-fun-n-uconstr

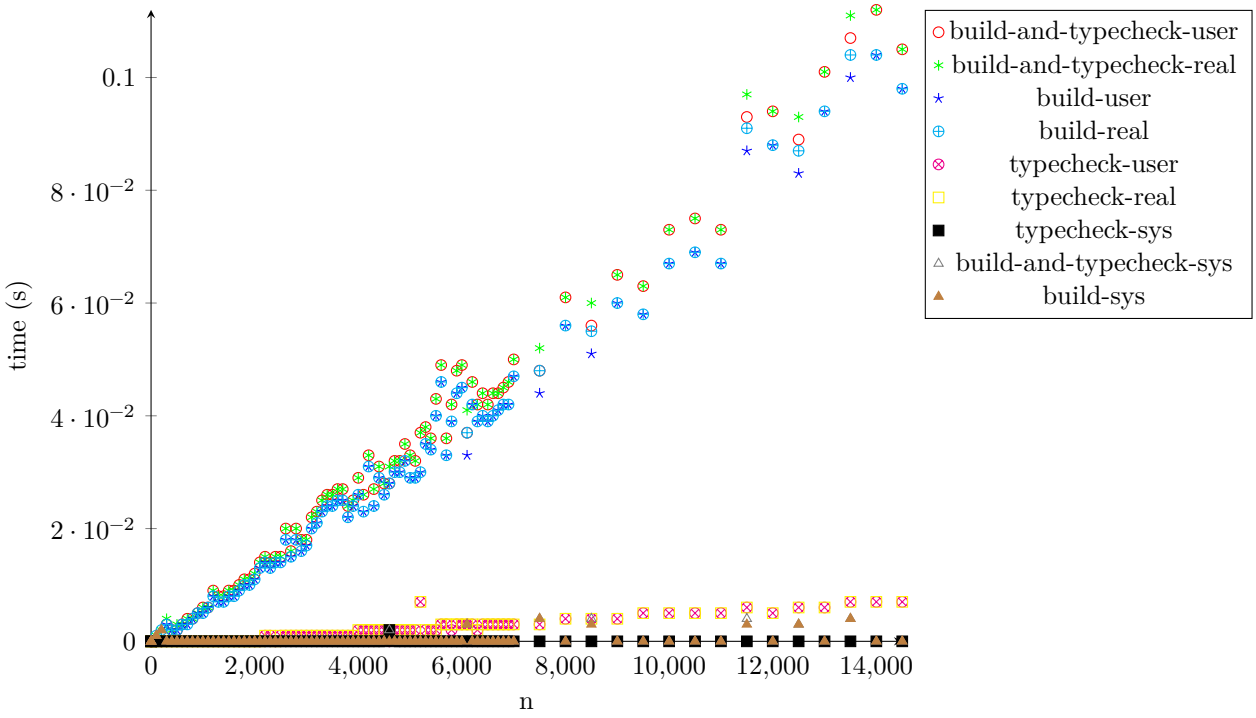


Figure 14: timing-fun-n-ltac2

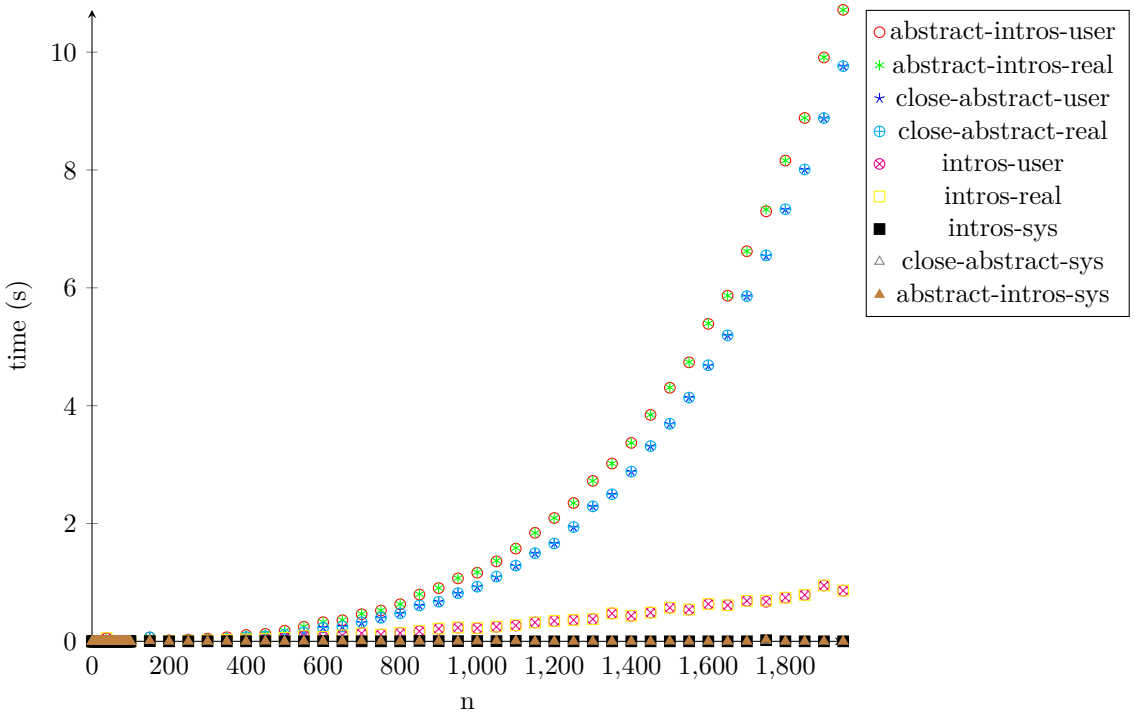


Figure 15: timing-intros-n-fun

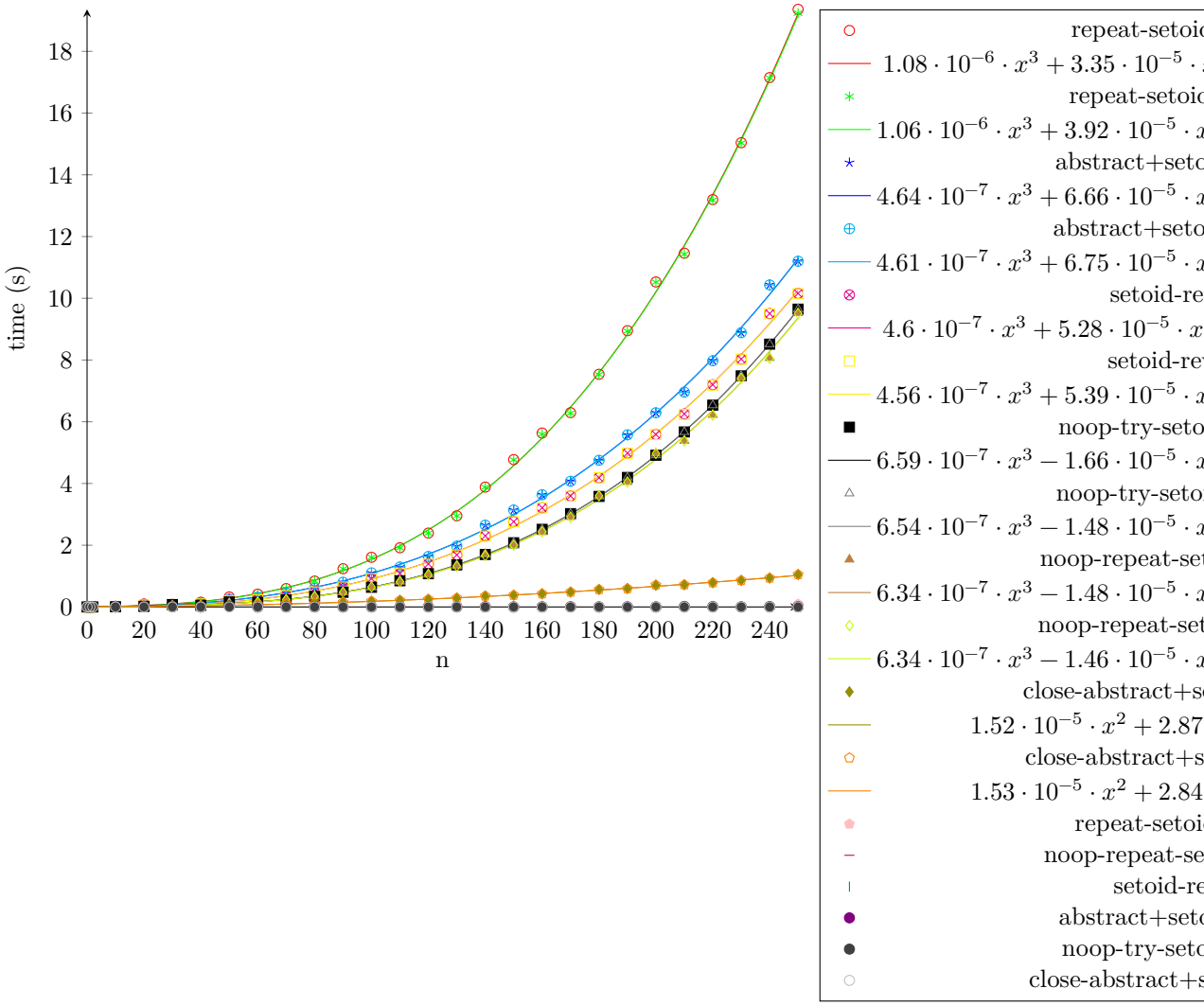


Figure 16: timing-repeat-setoid-rewrite-under-binders

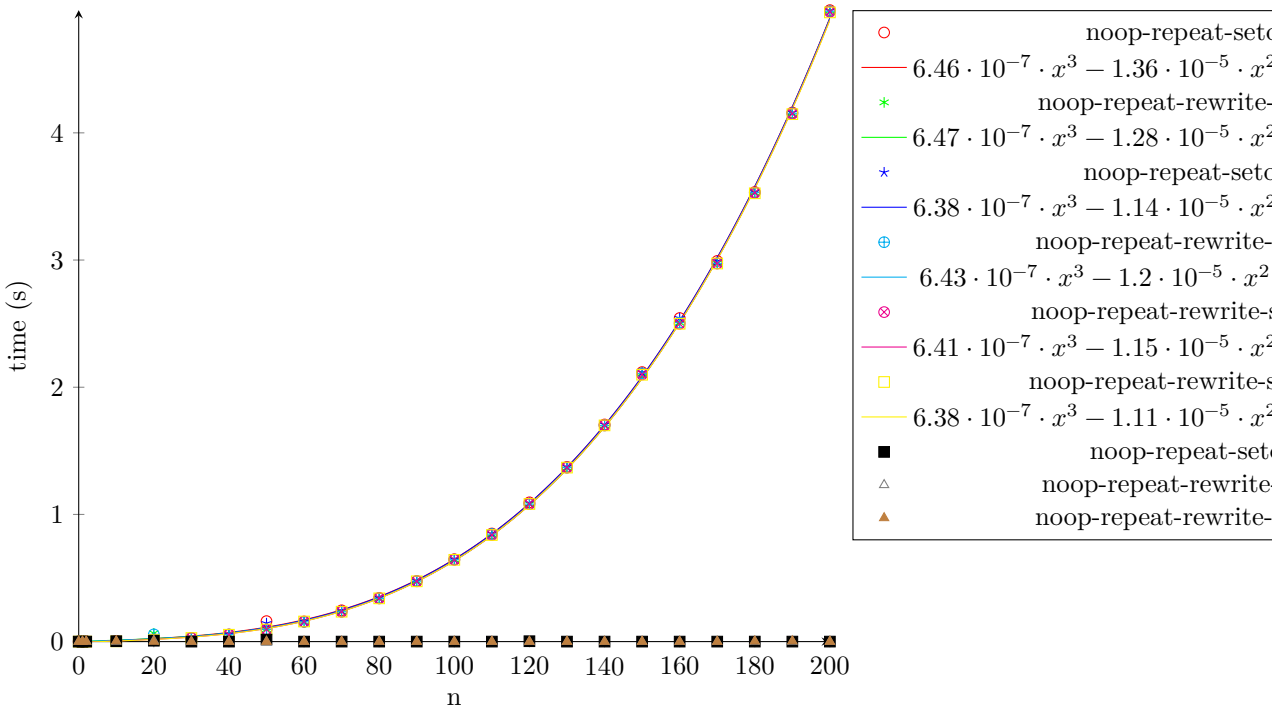


Figure 17: timing-repeat-setoid-rewrite-under-binders-noop

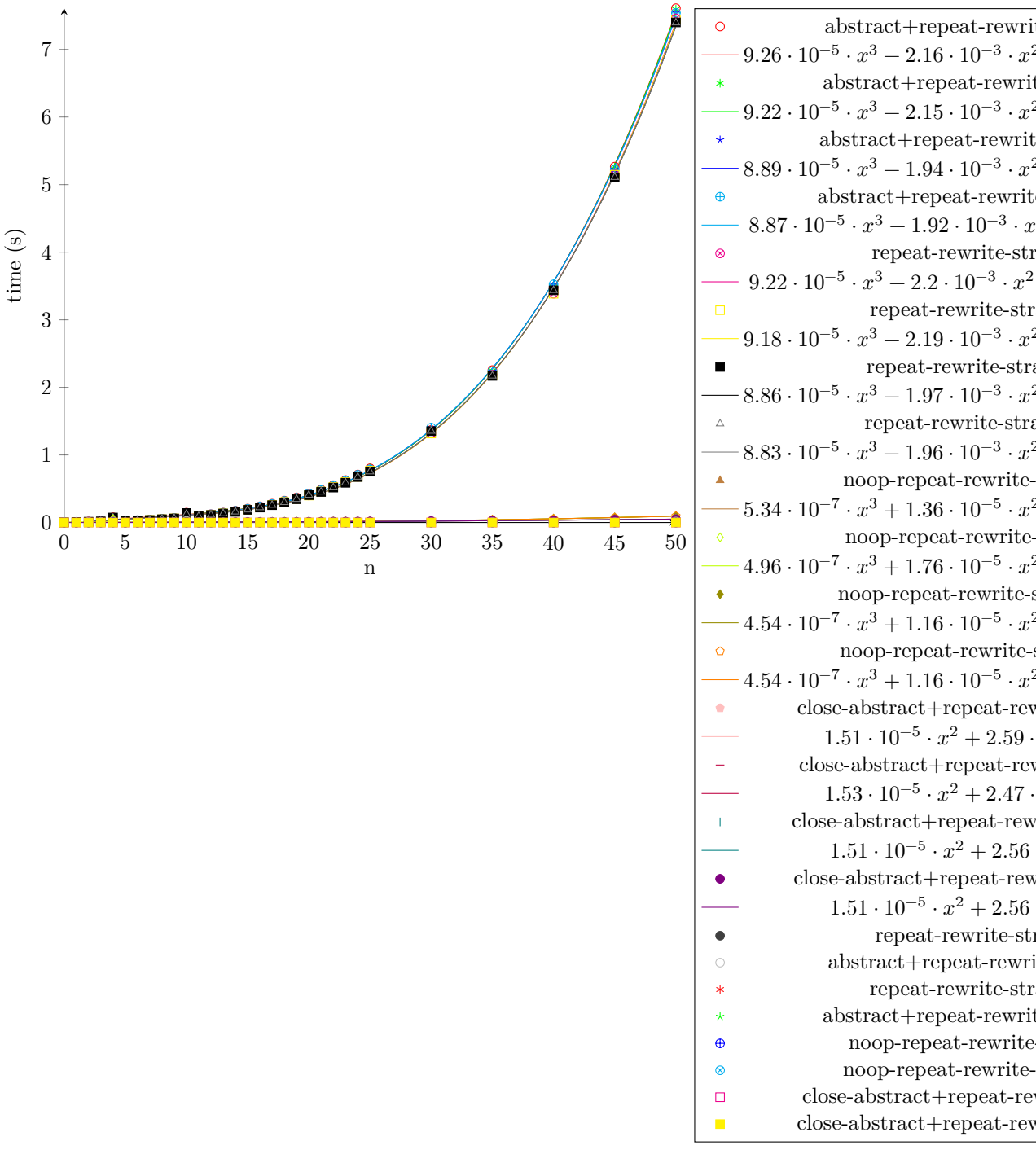


Figure 18: timing-rewrite-strat-under-binders

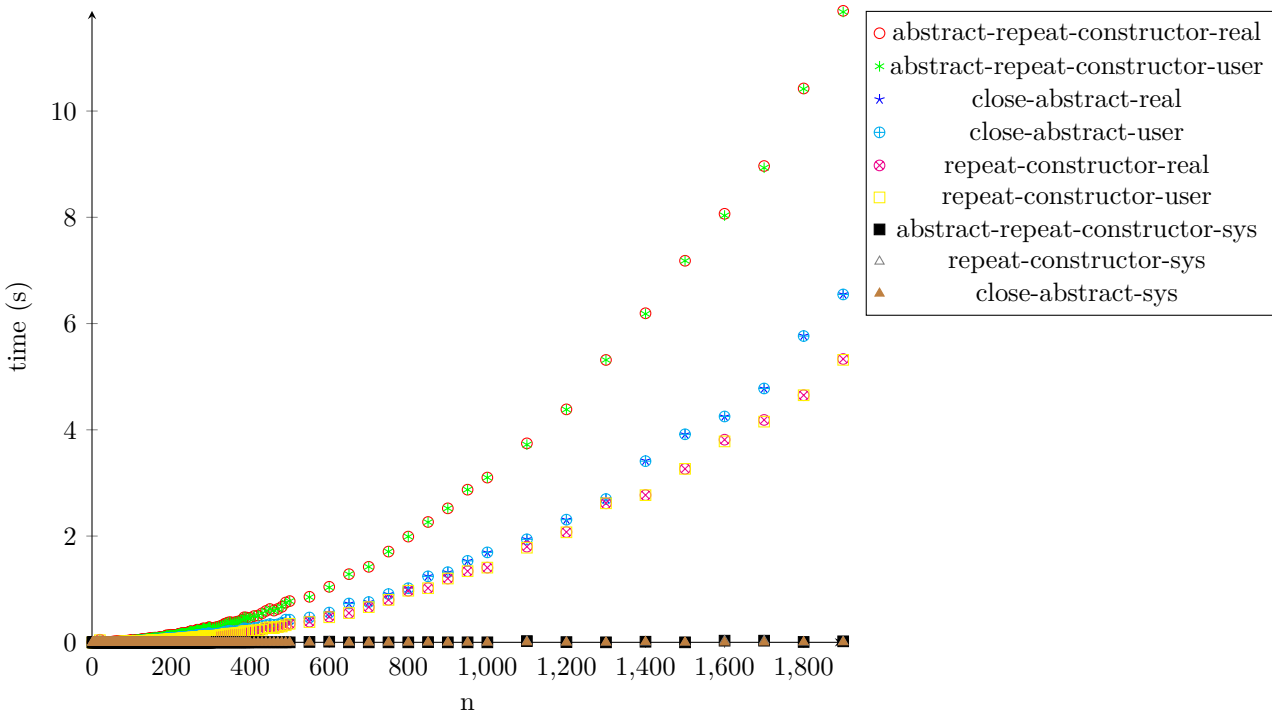


Figure 19: timing-conj-True-repeat-constructor

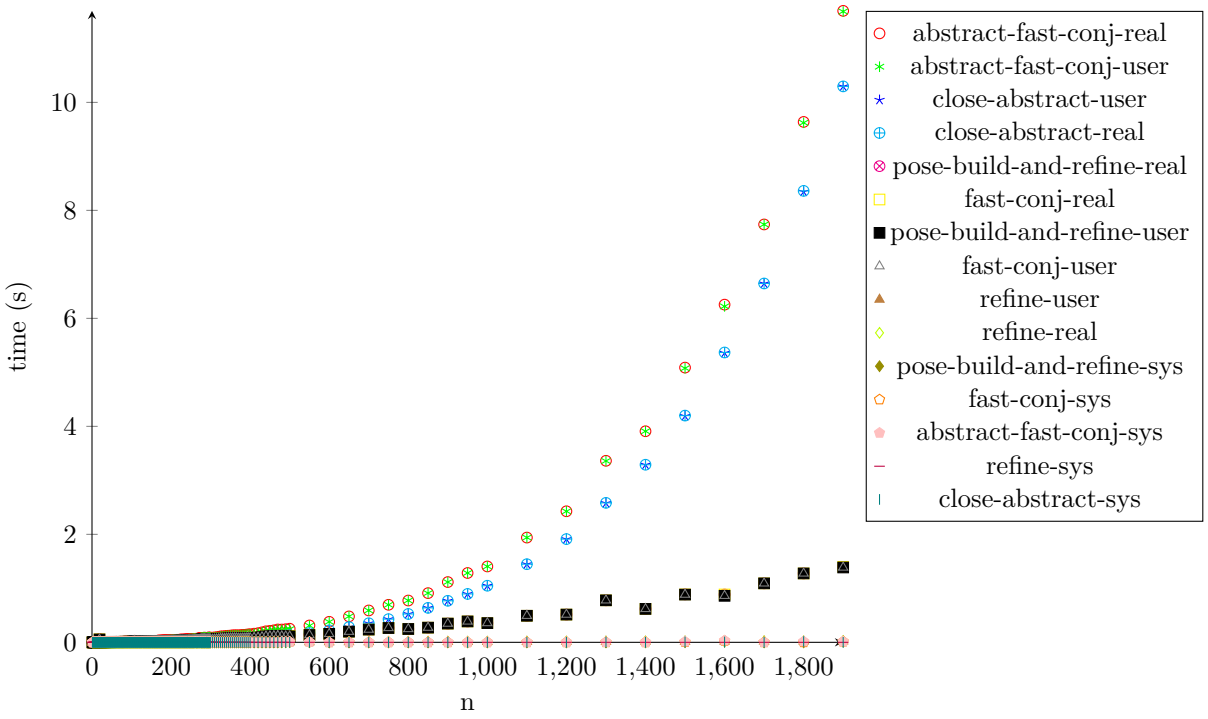


Figure 20: timing-conj-True-fast-conj

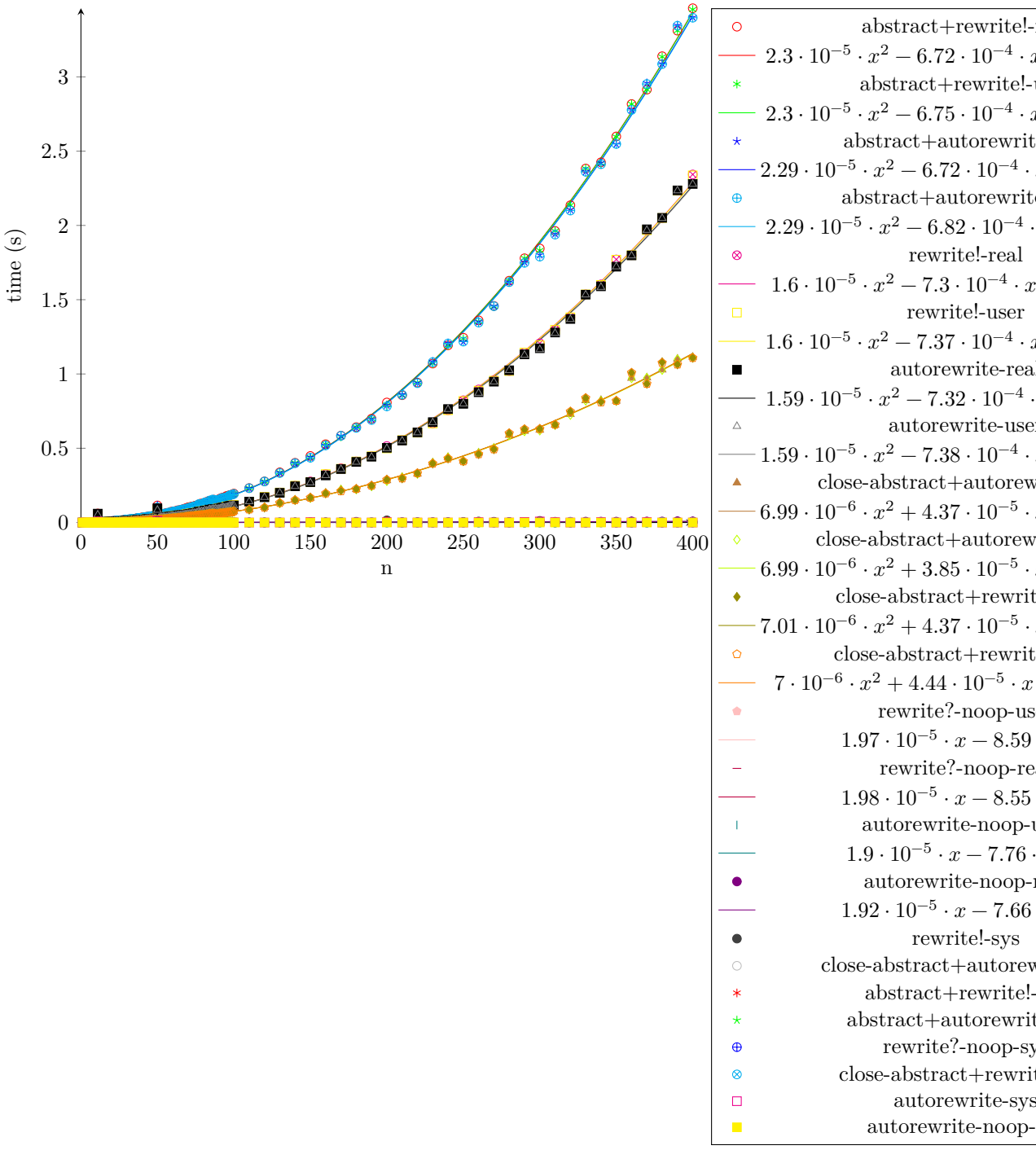


Figure 21: timing-rewrite-repeated-app-autorewrite

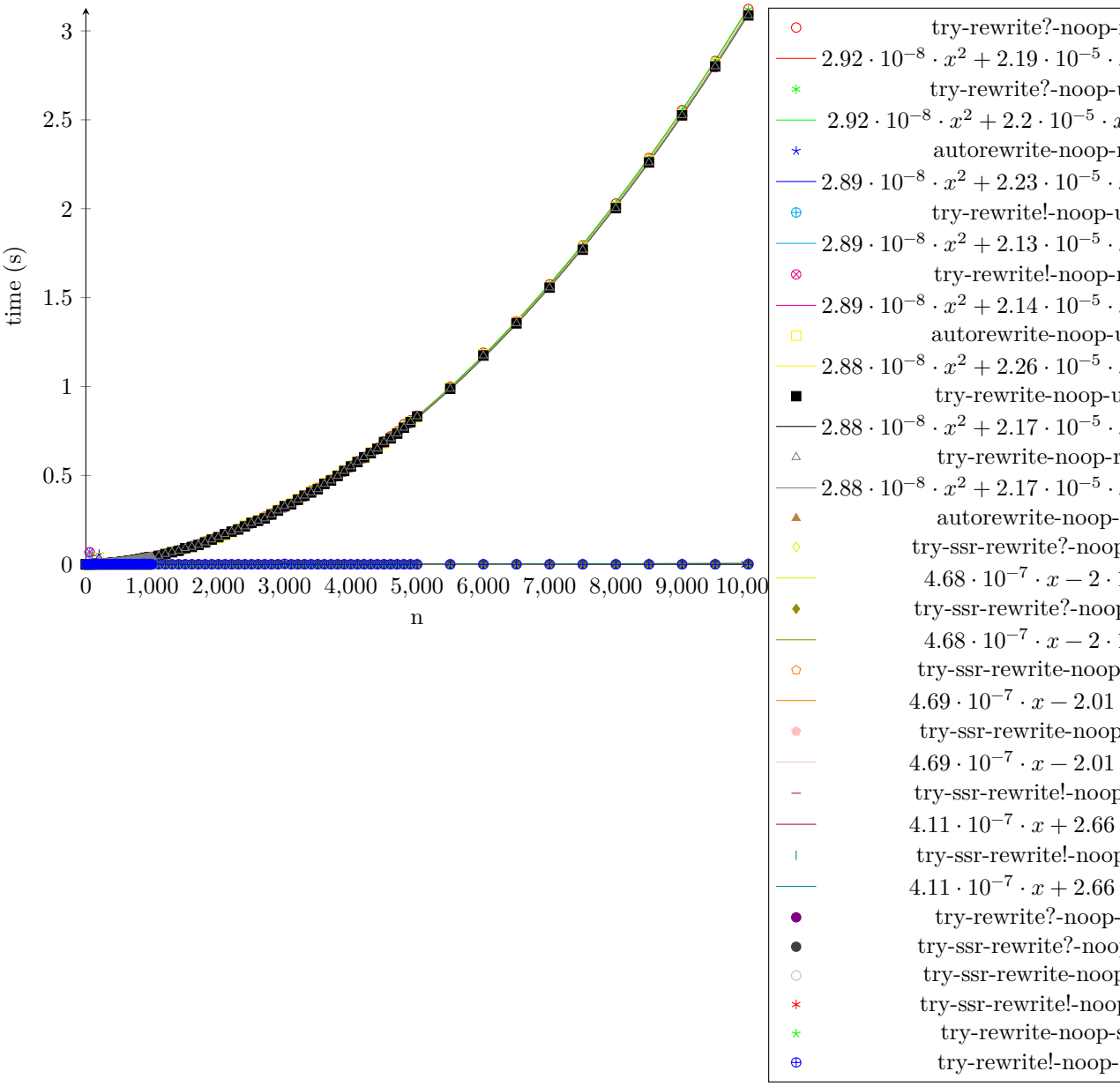


Figure 22: timing-rewrite-repeated-app-autorewrite-noop

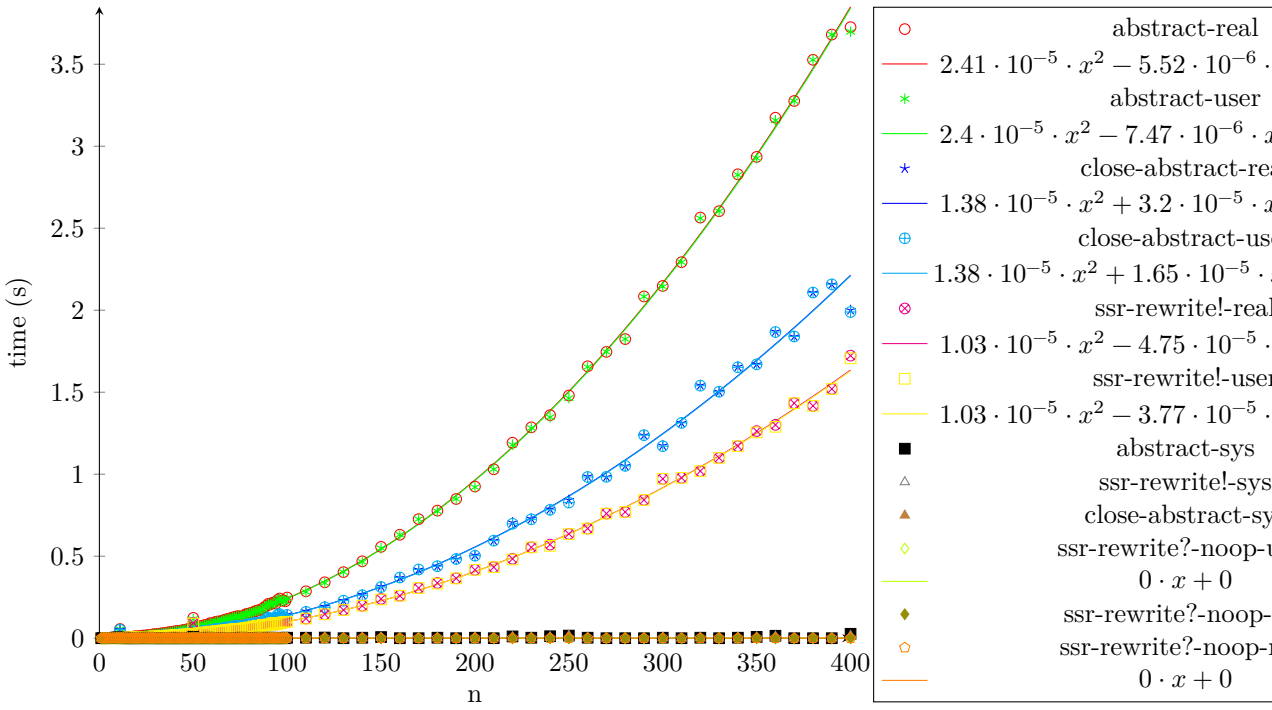


Figure 23: timing-rewrite-repeated-app-ssrrewrite

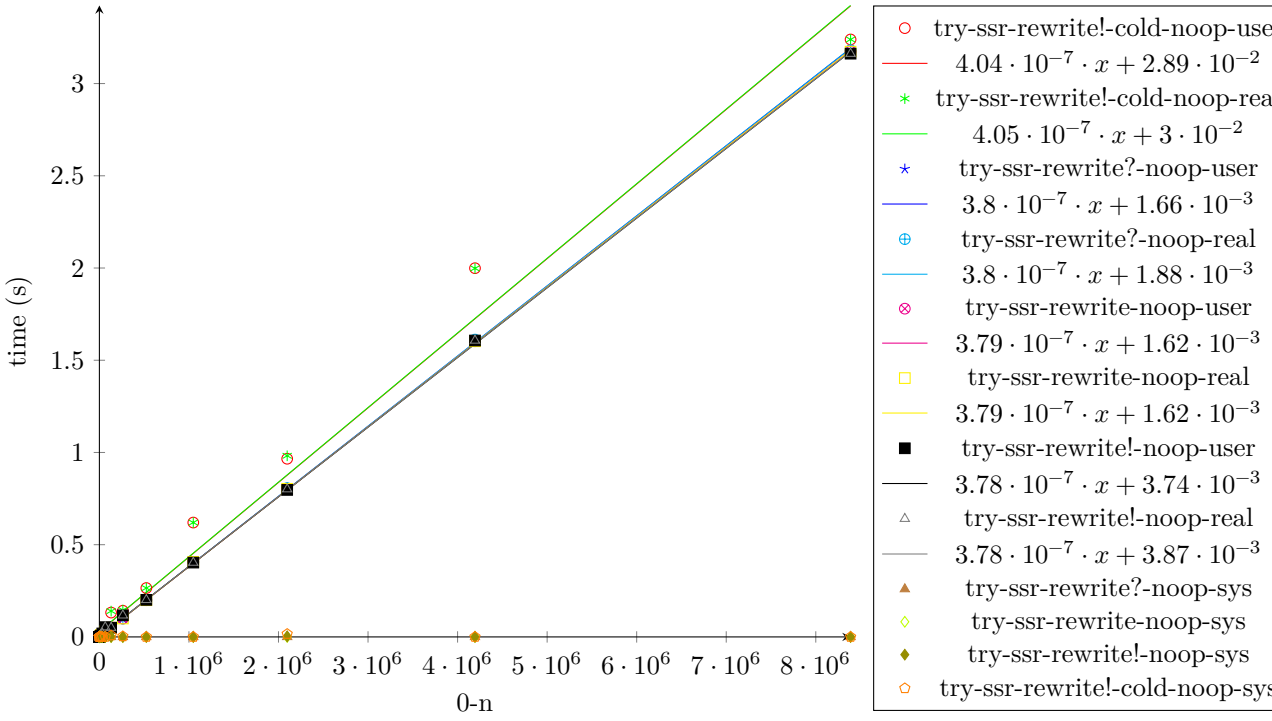


Figure 24: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

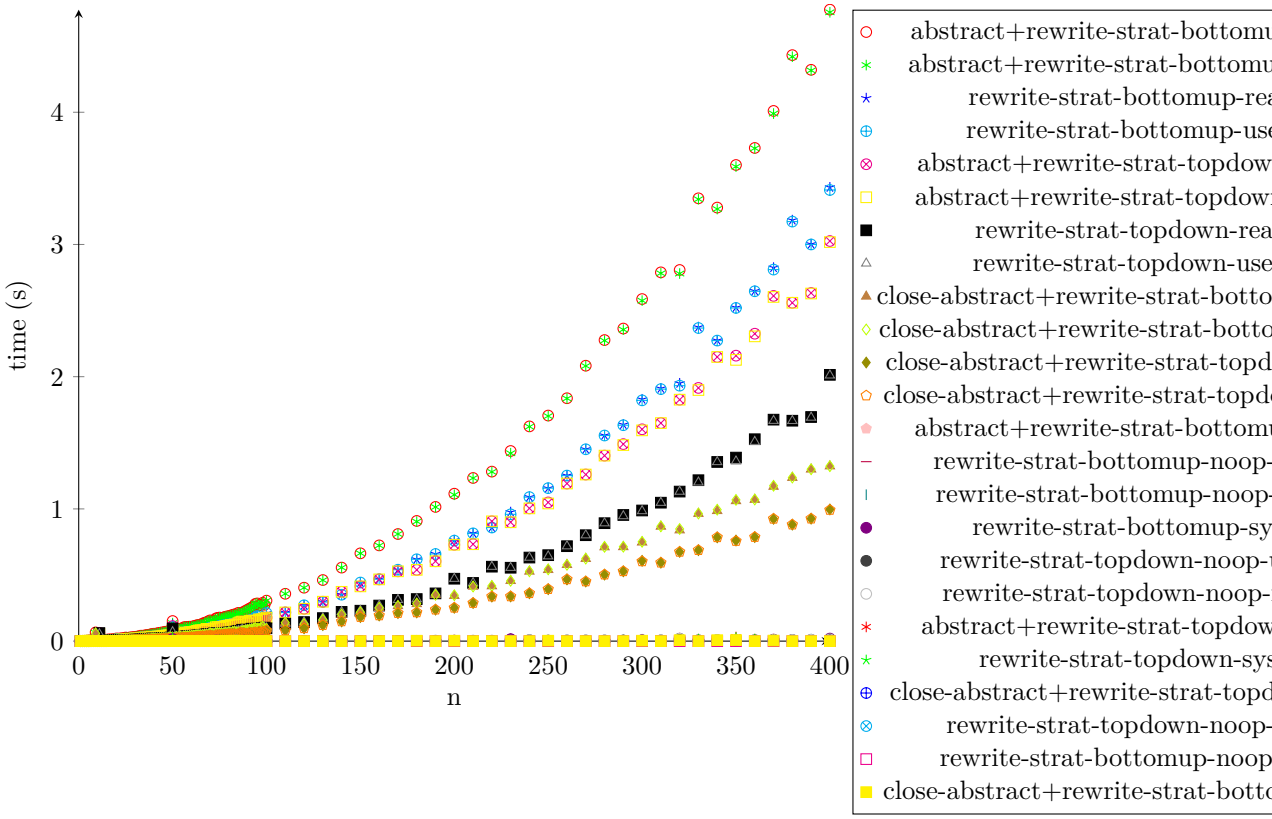


Figure 25: timing-rewrite-repeated-app-rewrite-strat

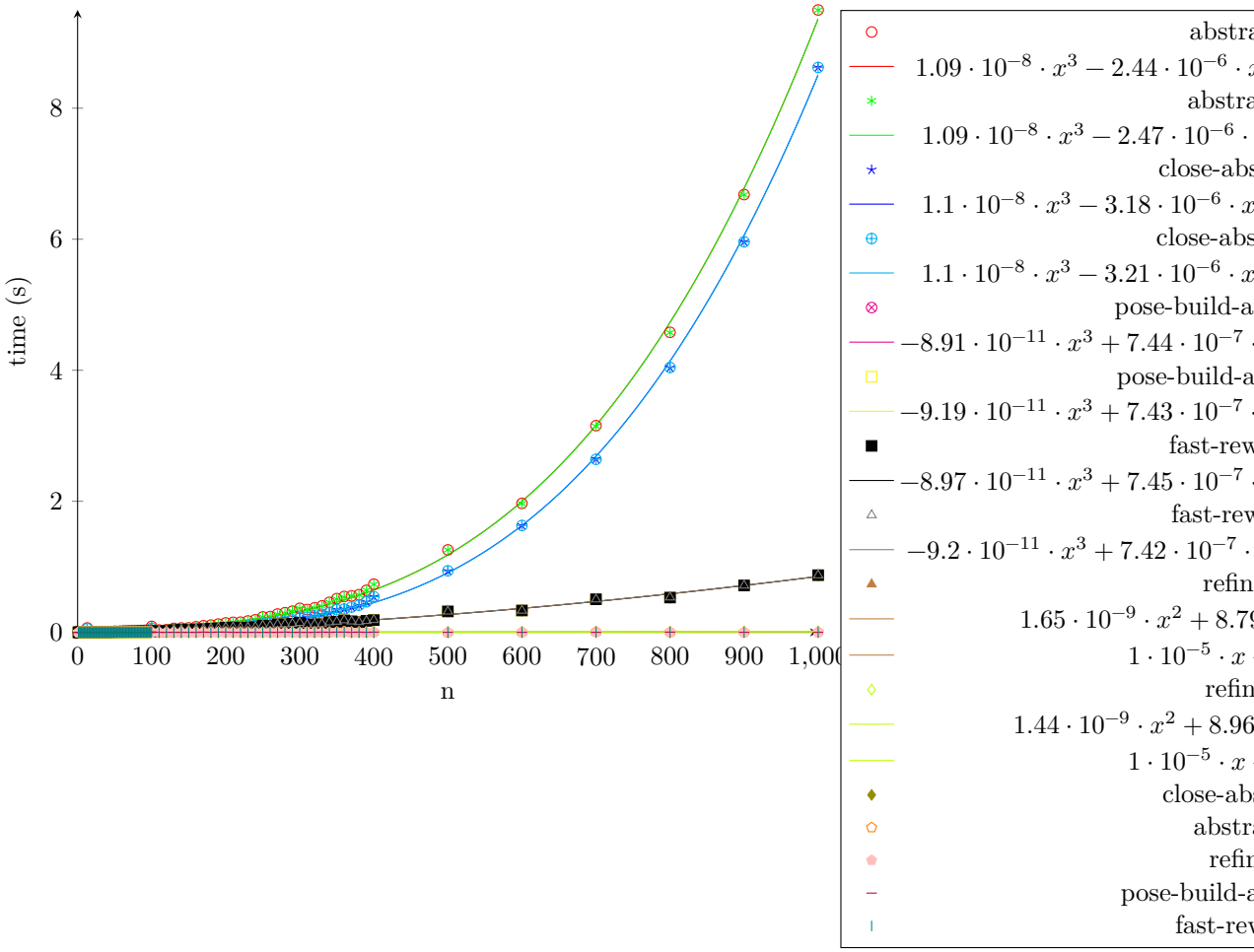
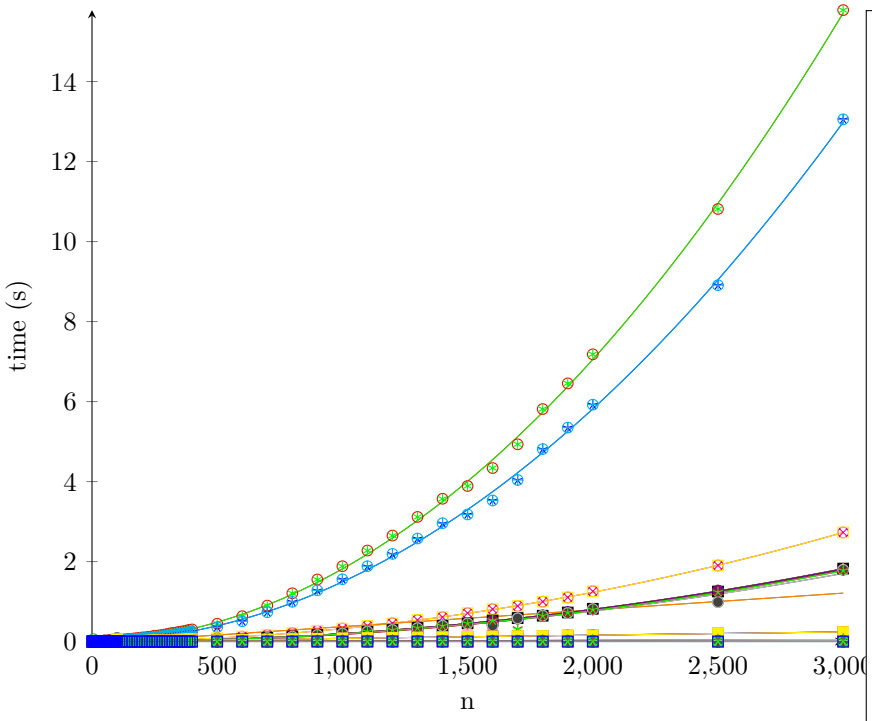


Figure 26: timing-rewrite-repeated-app-fast-rewrite


time (s)
n
0
2
4
6
8
10
12
14
0
500
1,000
1,500
2,000
2,500
3,000

abstract-real
$1.71 \cdot 10^{-6} \cdot x^2 + 9.68 \cdot 10^{-5} \cdot x$
abstract-user
$1.71 \cdot 10^{-6} \cdot x^2 + 9.57 \cdot 10^{-5} \cdot x$
fast-rewrite-user
$1.42 \cdot 10^{-6} \cdot x^2 + 6.4 \cdot 10^{-5} \cdot x$
fast-rewrite-real
$1.42 \cdot 10^{-6} \cdot x^2 + 6.5 \cdot 10^{-5} \cdot x$
close-abstract-use
$2.93 \cdot 10^{-7} \cdot x^2 + 3.08 \cdot 10^{-5} \cdot$
close-abstract-rea
$2.93 \cdot 10^{-7} \cdot x^2 + 3.1 \cdot 10^{-5} \cdot x$
check-pf-cast-rea
$2.04 \cdot 10^{-7} \cdot x^2 - 4.54 \cdot 10^{-6} \cdot x$
check-pf-cast-use
$2.04 \cdot 10^{-7} \cdot x^2 - 4.33 \cdot 10^{-6} \cdot x$
type-admit-user
$2.04 \cdot 10^{-7} \cdot x^2 - 6.74 \cdot 10^{-6} \cdot x$
type-admit-real
$2.04 \cdot 10^{-7} \cdot x^2 - 6.74 \cdot 10^{-6} \cdot x$
refine-user
$2.03 \cdot 10^{-7} \cdot x^2 - 3.2 \cdot 10^{-6} \cdot x$
$4.19 \cdot 10^{-4} \cdot x - 4.56 \cdot$
refine-real
$2.03 \cdot 10^{-7} \cdot x^2 - 3.18 \cdot 10^{-6} \cdot$
$4.19 \cdot 10^{-4} \cdot x - 4.56 \cdot$
type-pf-cast-user
$2.14 \cdot 10^{-7} \cdot x^2 - 4.23 \cdot 10^{-5} \cdot x$
type-pf-cast-real
$2.14 \cdot 10^{-7} \cdot x^2 - 4.15 \cdot 10^{-5} \cdot x$
type-admit-cast-us
$2.04 \cdot 10^{-7} \cdot x^2 - 5.02 \cdot 10^{-6} \cdot x$
type-admit-cast-re
$2.04 \cdot 10^{-7} \cdot x^2 - 5.02 \cdot 10^{-6} \cdot x$
check-admit-user
$1.88 \cdot 10^{-7} \cdot x^2 + 5.15 \cdot 10^{-6} \cdot x$
check-admit-real
$1.88 \cdot 10^{-7} \cdot x^2 + 5.13 \cdot 10^{-6} \cdot x$
check-admit-cast-u
$2.02 \cdot 10^{-7} \cdot x^2 - 1.65 \cdot 10^{-5} \cdot$
check-admit-cast-re
$2.02 \cdot 10^{-7} \cdot x^2 - 1.61 \cdot 10^{-5} \cdot x$
build-eval-thunk-us
$8.1 \cdot 10^{-5} \cdot x - 5.75 \cdot$
build-eval-thunk-re
$8.1 \cdot 10^{-5} \cdot x - 4.06 \cdot$
build-thunk-user
$8.02 \cdot 10^{-5} \cdot x - 6.59 \cdot$
build-thunk-real
$8.02 \cdot 10^{-5} \cdot x - 4.98 \cdot$

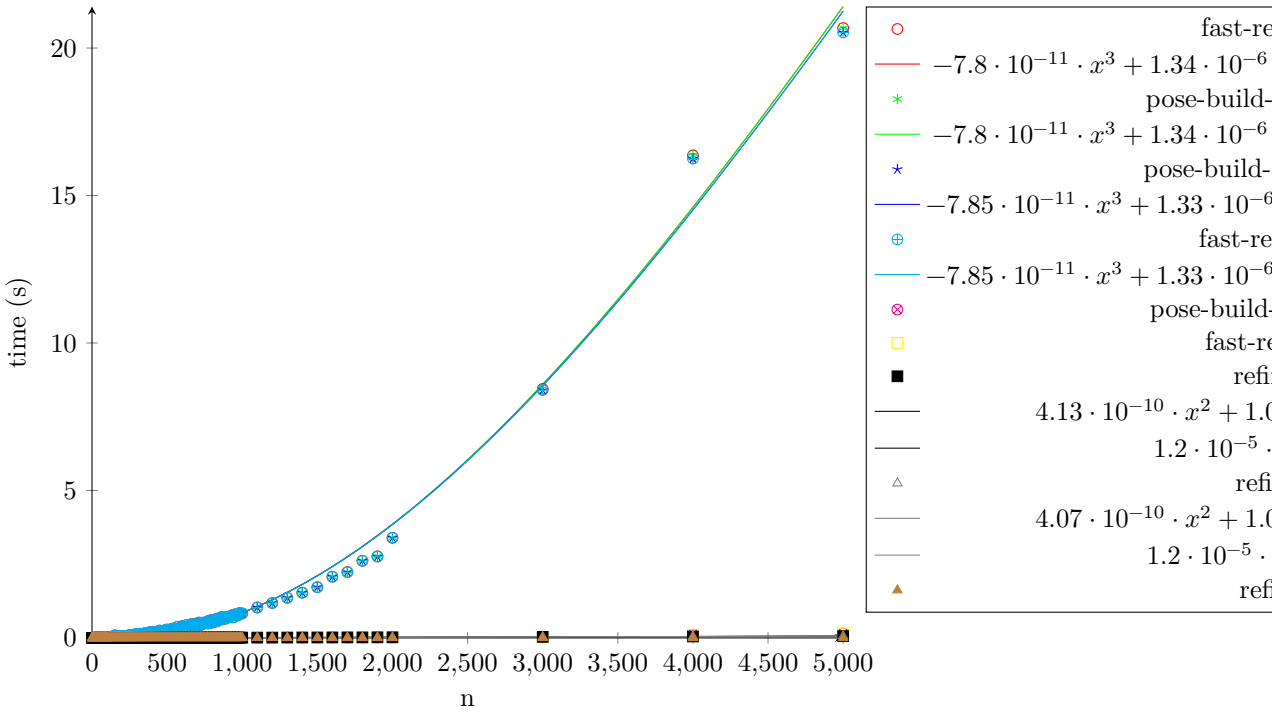


Figure 28: timing-rewrite-repeated-app-fast-rewrite-no-abstract

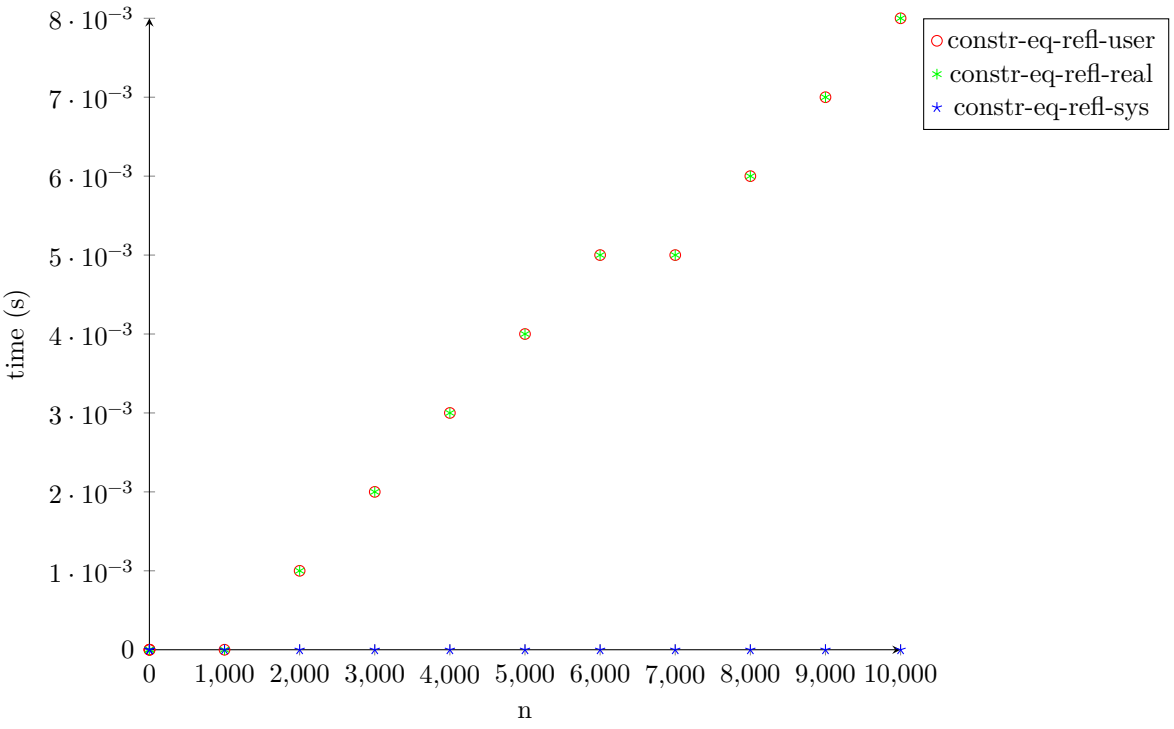


Figure 29: timing-constr-eq-alpha

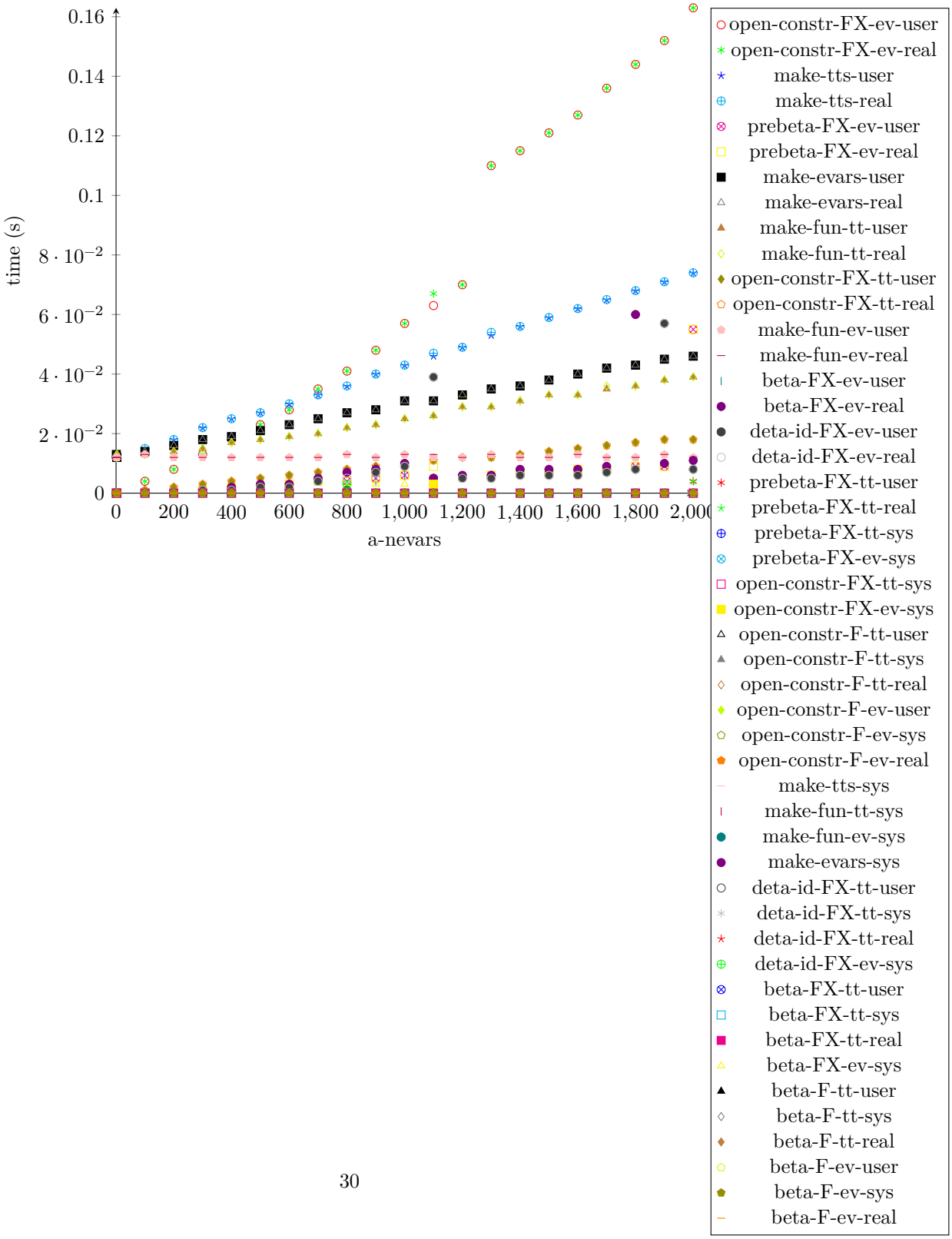


Figure 30: timing-lift-identity-evar-subst-nevars param-ctx-size 0, 1, param-extra-binders 0, 1

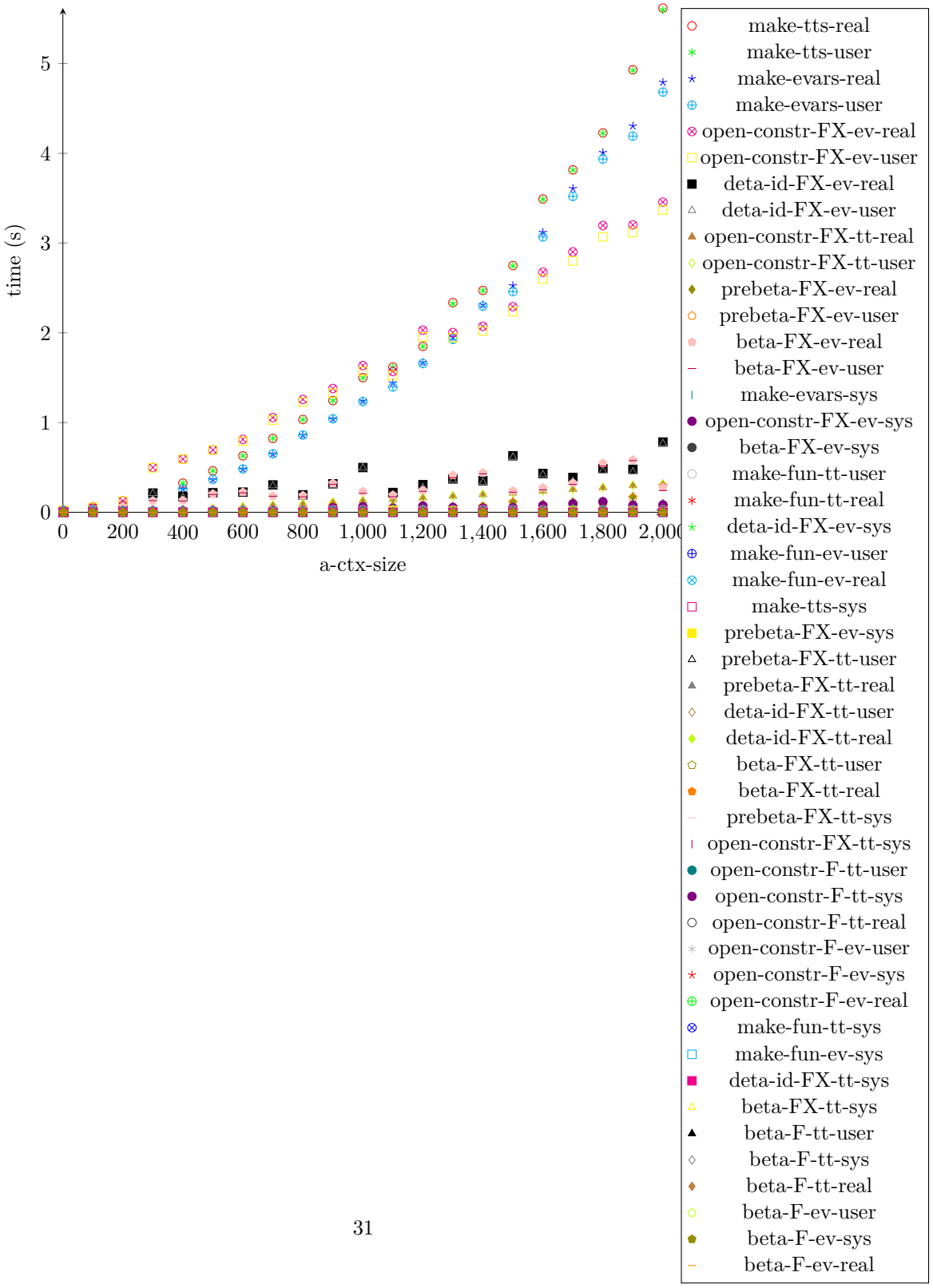


Figure 31: timing-lift-identity-evar-subst-ctx param-extra-binders 0, 1, param-nevars 0, 1

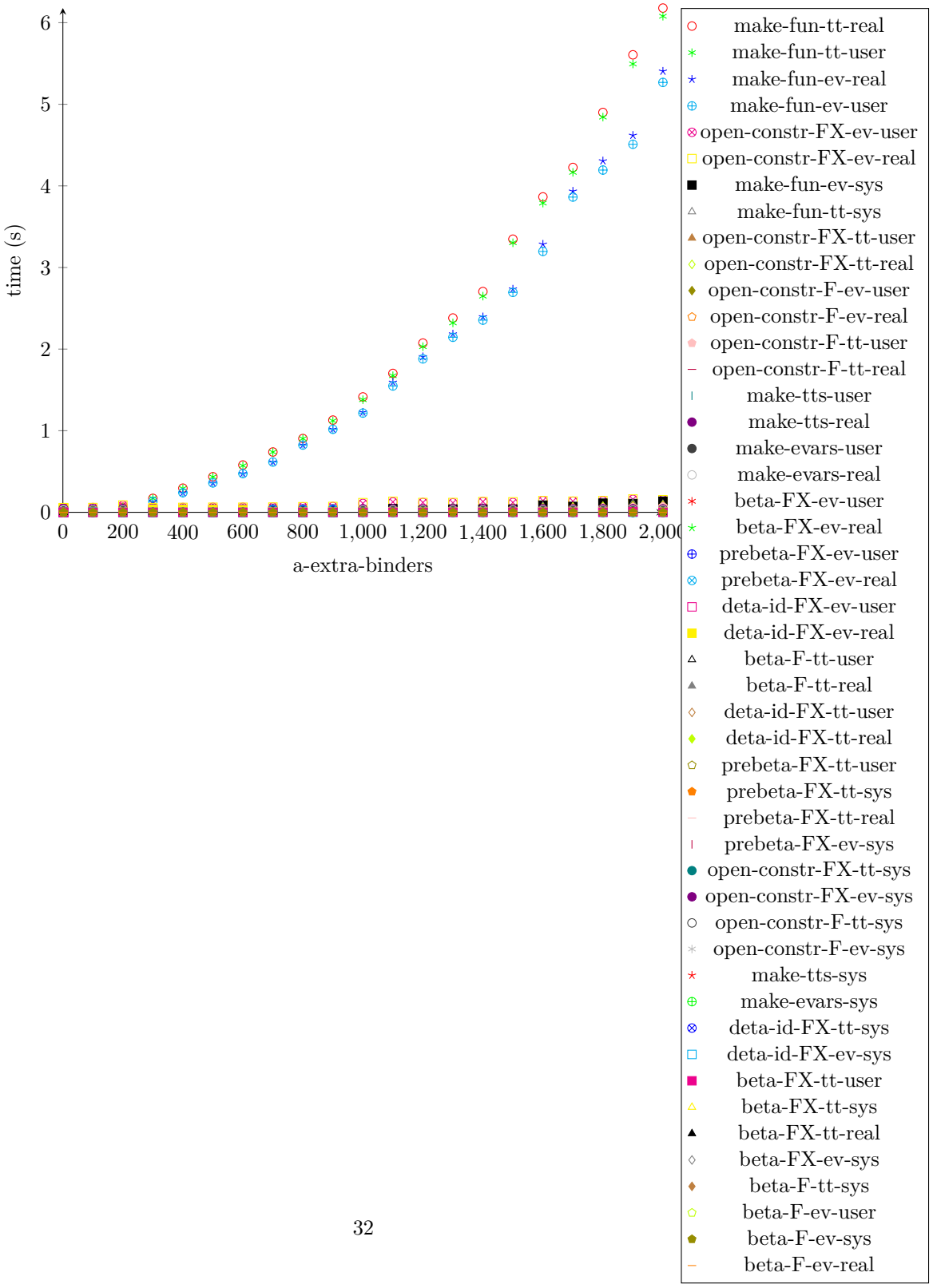


Figure 32: timing-lift-identity-evar-subst-binders param-ctx-size 0, 1, param-nevars 0, 1

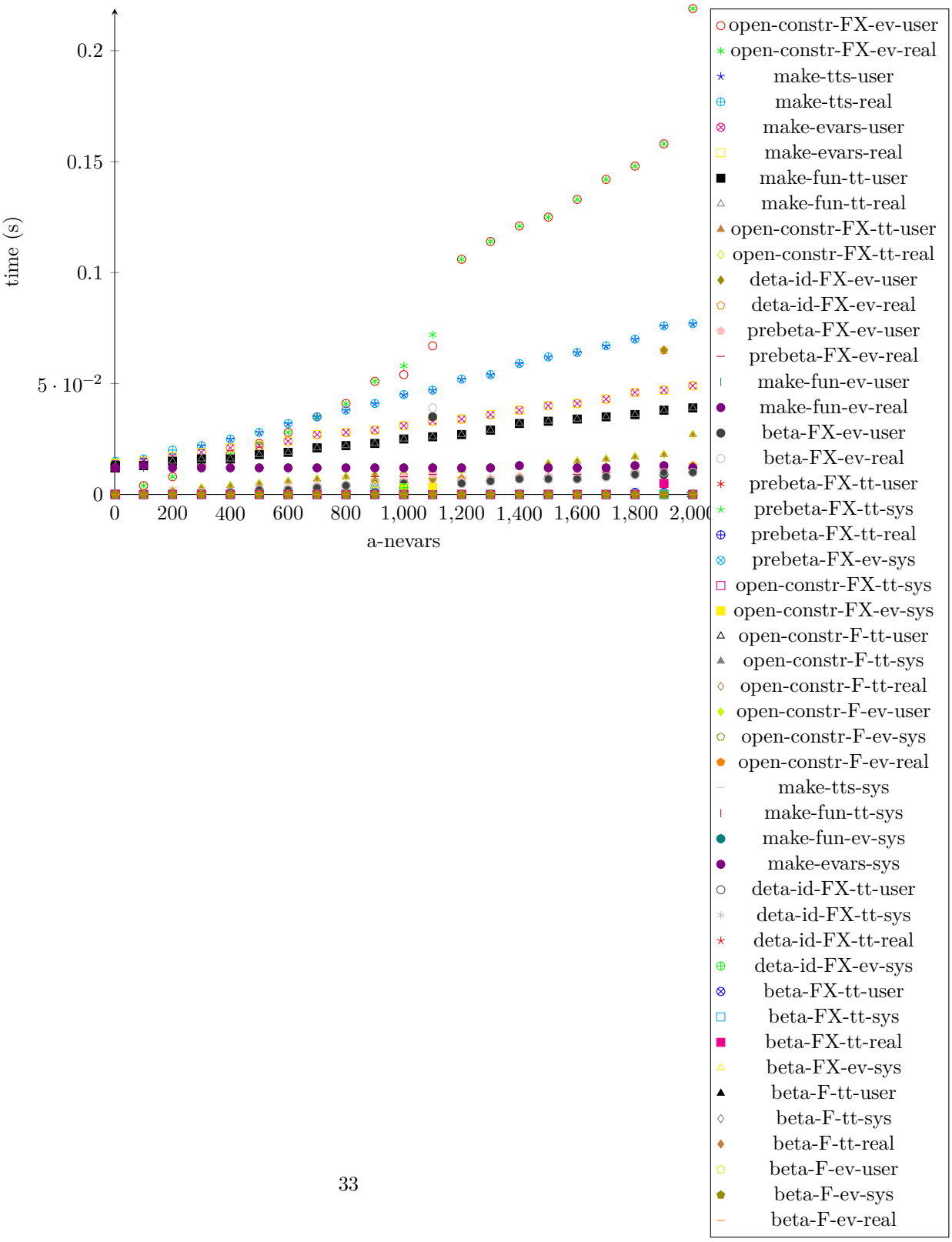


Figure 33: timing-lift-non-identity-evar-subst-nevars param-ctx-size 0, 1, param-extra-binders 0, 1

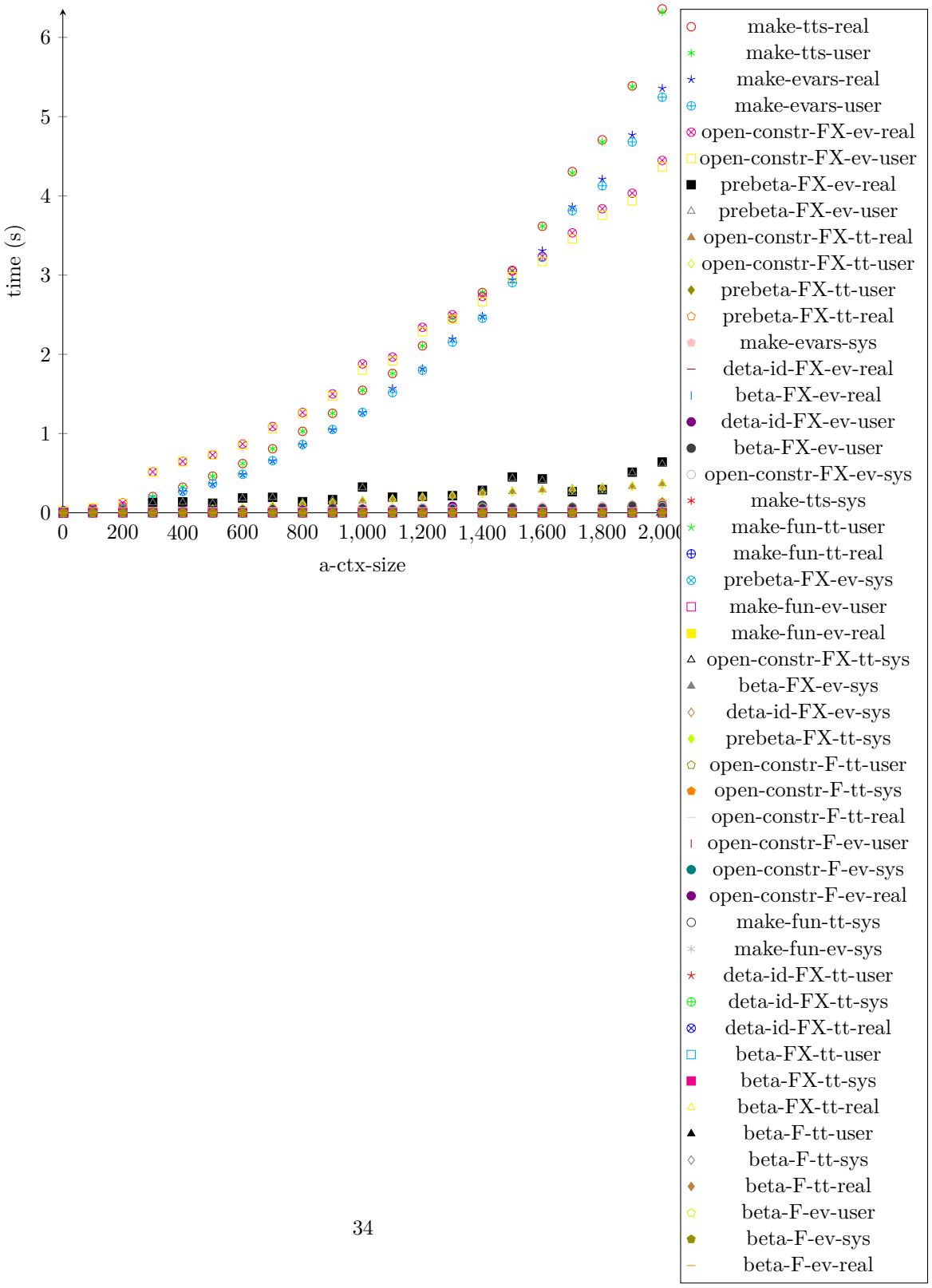


Figure 34: timing-lift-non-identity-evar-subst-ctx param-extra-binders 0, 1, param-nevars 0, 1

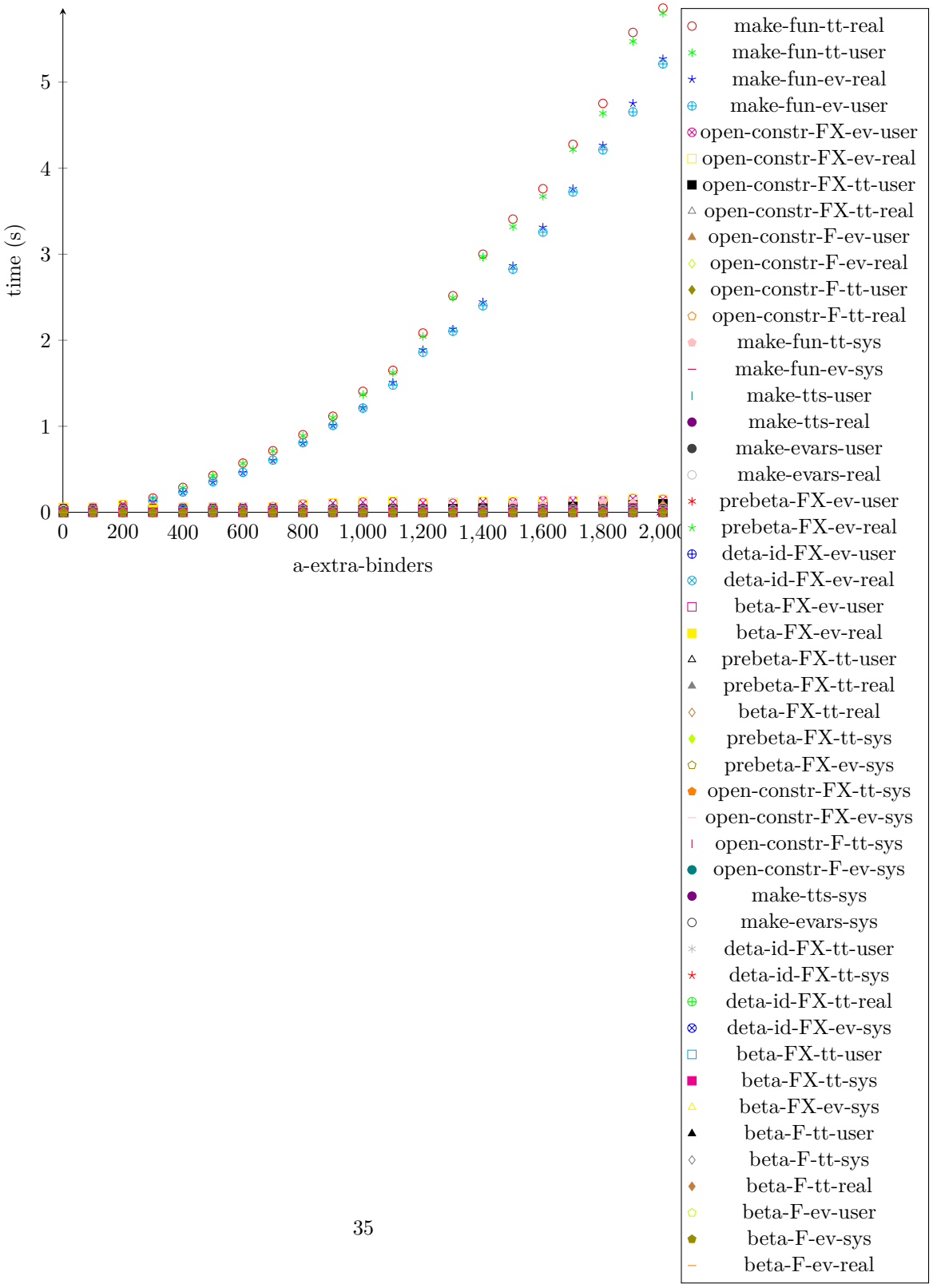
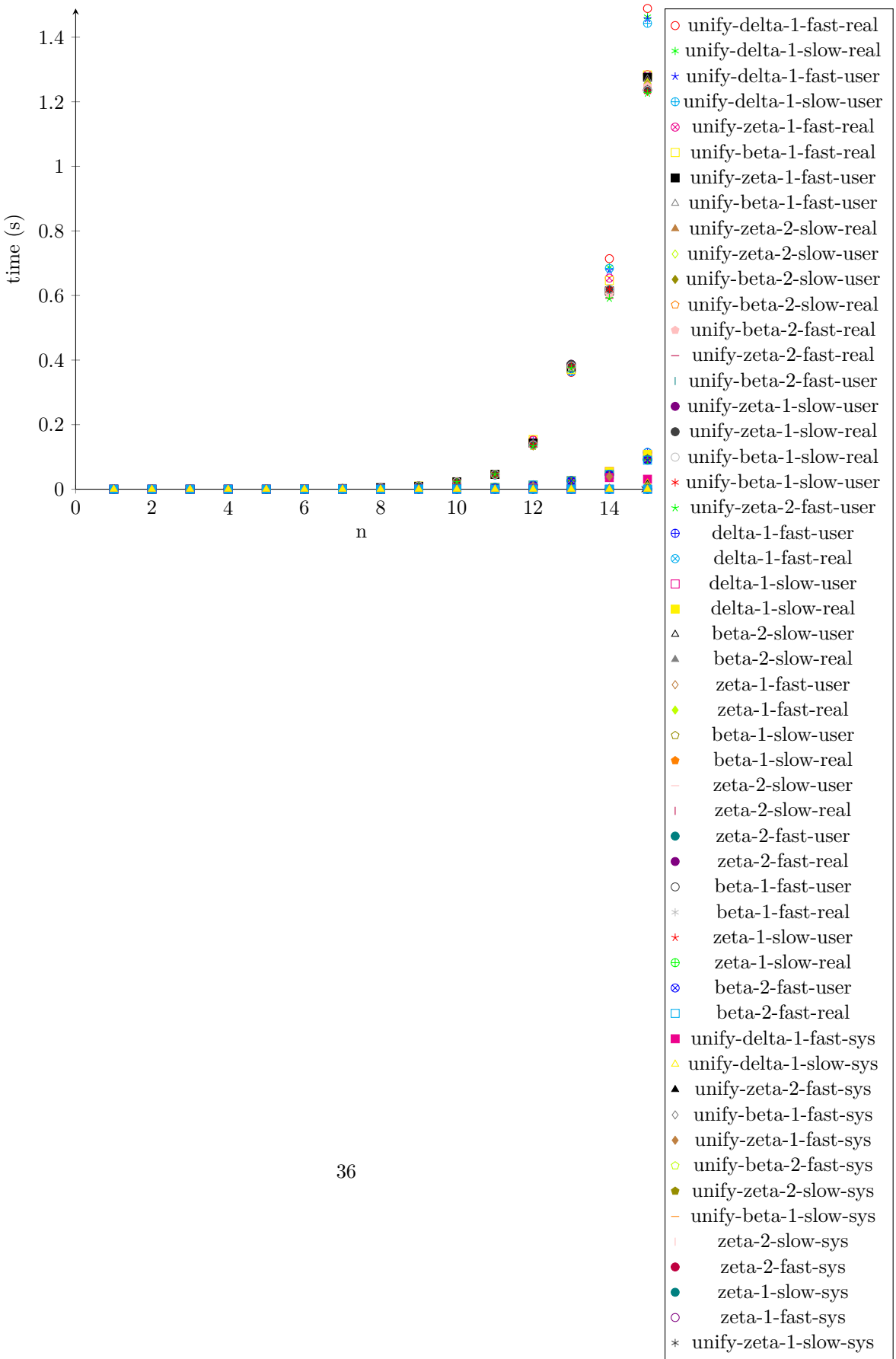
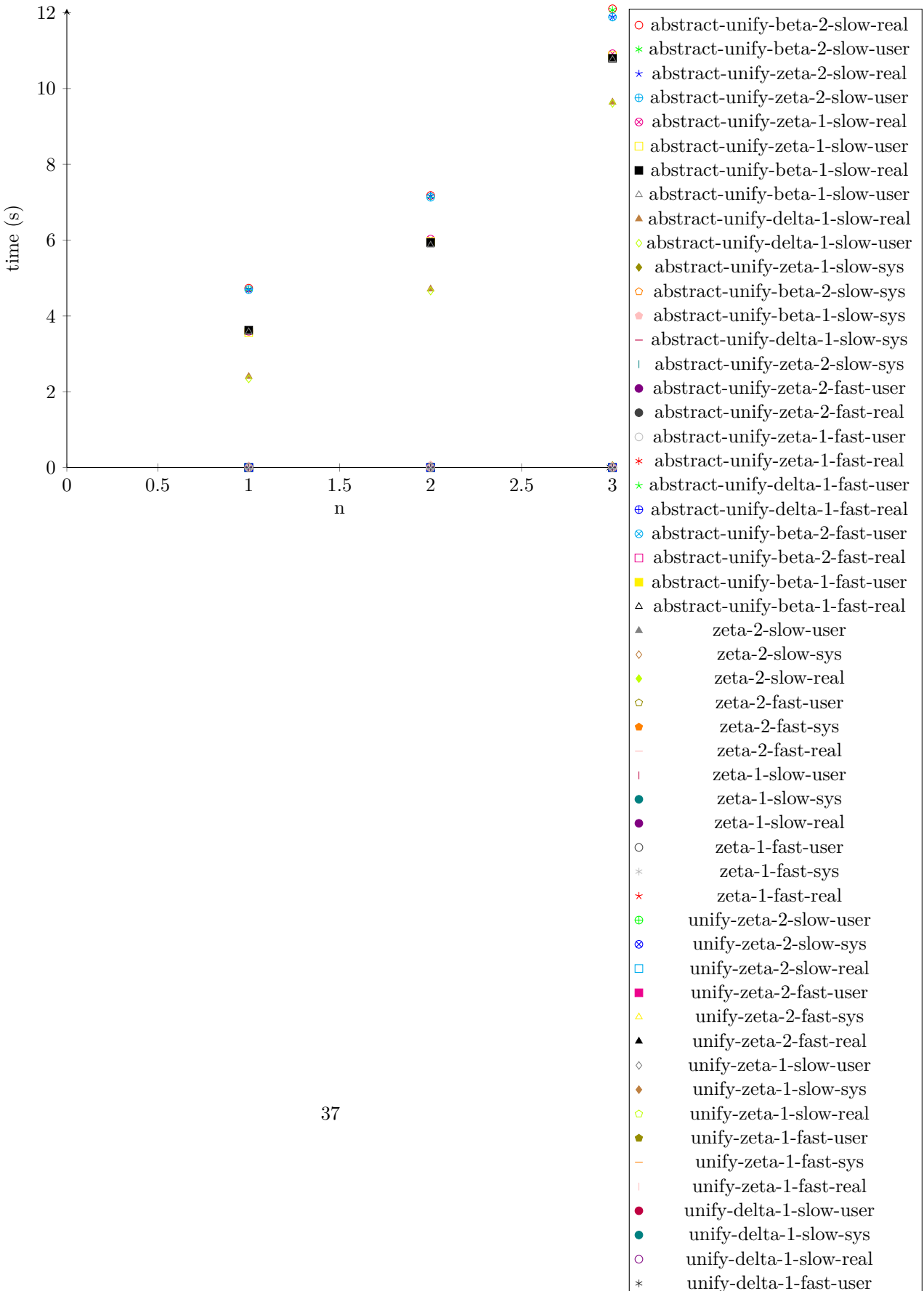


Figure 35: timing-lift-non-identity-evar-subst-binders param-ctx-size 0, 1, param-nevars 0, 1


time (s)
n
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
2
4
6
8
10
12
14
unify-delta-1-fast-real
unify-delta-1-slow-real
unify-delta-1-fast-user
unify-delta-1-slow-user
unify-zeta-1-fast-real
unify-beta-1-fast-real
unify-zeta-1-fast-user
unify-beta-1-fast-user
unify-zeta-2-slow-real
unify-zeta-2-slow-user
unify-beta-2-slow-user
unify-beta-2-slow-real
unify-beta-2-fast-real
unify-zeta-2-fast-real
unify-beta-2-fast-user
unify-zeta-1-slow-user
unify-zeta-1-slow-real
unify-beta-1-slow-real
unify-beta-1-slow-user
unify-zeta-2-fast-user
delta-1-fast-user
delta-1-fast-real
delta-1-slow-user
delta-1-slow-real
beta-2-slow-user
beta-2-slow-real
zeta-1-fast-user
zeta-1-fast-real
beta-1-slow-user
beta-1-slow-real
zeta-2-slow-user
zeta-2-slow-real
zeta-2-fast-user
zeta-2-fast-real
beta-1-fast-user
beta-1-fast-real
zeta-1-slow-user
zeta-1-slow-real
beta-2-fast-user
beta-2-fast-real
unify-delta-1-fast-sys
unify-delta-1-slow-sys
unify-zeta-2-fast-sys
unify-beta-1-fast-sys
unify-zeta-1-fast-sys
unify-beta-2-fast-sys
unify-zeta-2-slow-sys
unify-beta-1-slow-sys
zeta-2-slow-sys
zeta-2-fast-sys
zeta-1-slow-sys
zeta-1-fast-sys
unify-zeta-1-slow-sys


time (s)
n
0
2
4
6
8
10
12
0
0.5
1
1.5
2
2.5
3
abstract-unify-beta-2-slow-real
abstract-unify-beta-2-slow-user
abstract-unify-zeta-2-slow-real
abstract-unify-zeta-2-slow-user
abstract-unify-zeta-1-slow-real
abstract-unify-zeta-1-slow-user
abstract-unify-beta-1-slow-real
abstract-unify-beta-1-slow-user
abstract-unify-delta-1-slow-real
abstract-unify-delta-1-slow-user
abstract-unify-zeta-1-slow-sys
abstract-unify-beta-2-slow-sys
abstract-unify-beta-1-slow-sys
abstract-unify-delta-1-slow-sys
abstract-unify-zeta-2-slow-sys
abstract-unify-zeta-2-fast-user
abstract-unify-zeta-2-fast-real
abstract-unify-zeta-1-fast-user
abstract-unify-zeta-1-fast-real
abstract-unify-delta-1-fast-user
abstract-unify-delta-1-fast-real
abstract-unify-beta-2-fast-user
abstract-unify-beta-2-fast-real
abstract-unify-beta-1-fast-user
abstract-unify-beta-1-fast-real
zeta-2-slow-user
zeta-2-slow-sys
zeta-2-slow-real
zeta-2-fast-user
zeta-2-fast-sys
zeta-2-fast-real
zeta-1-slow-user
zeta-1-slow-sys
zeta-1-slow-real
zeta-1-fast-user
zeta-1-fast-sys
zeta-1-fast-real
unify-zeta-2-slow-user
unify-zeta-2-slow-sys
unify-zeta-2-slow-real
unify-zeta-2-fast-user
unify-zeta-2-fast-sys
unify-zeta-2-fast-real
unify-zeta-1-slow-user
unify-zeta-1-slow-sys
unify-zeta-1-slow-real
unify-zeta-1-fast-user
unify-zeta-1-fast-sys
unify-zeta-1-fast-real
unify-delta-1-slow-user
unify-delta-1-slow-sys
unify-delta-1-slow-real
unify-delta-1-fast-user

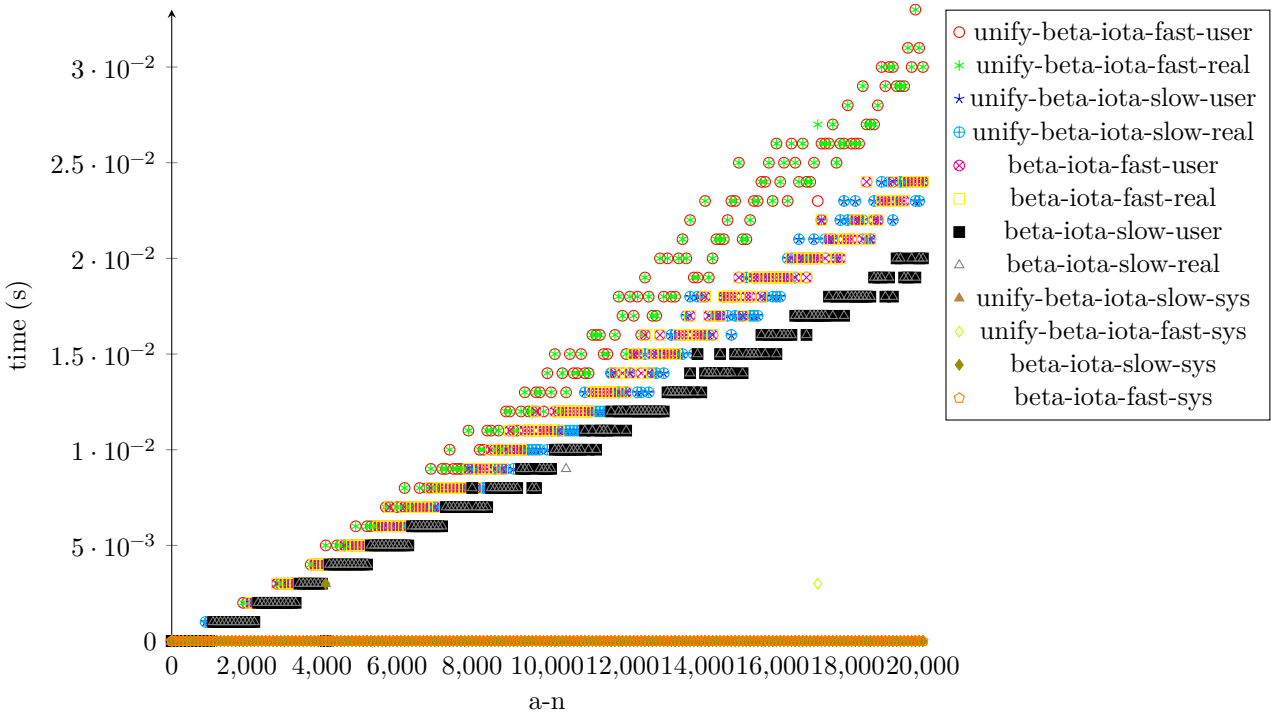


Figure 38: timing-iota-reduction-fact8 param-fact-n 8

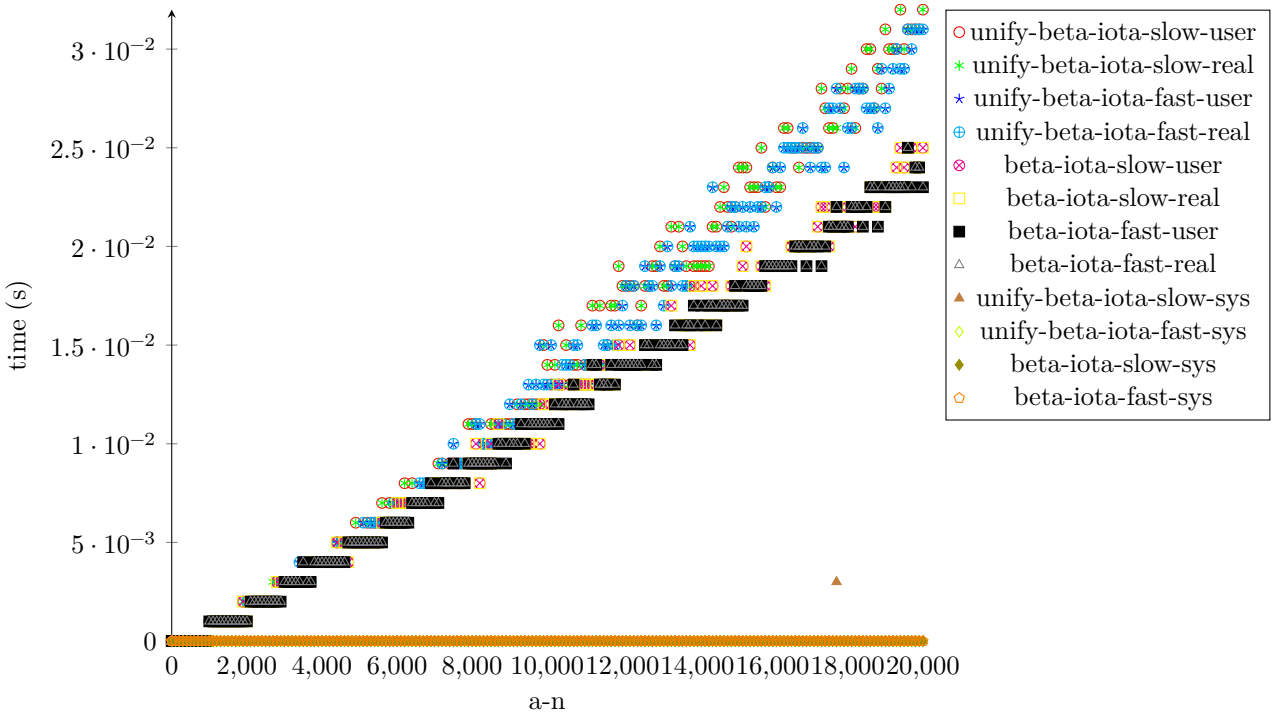


Figure 39: timing-iota-reduction-fact9 param-fact-n 9

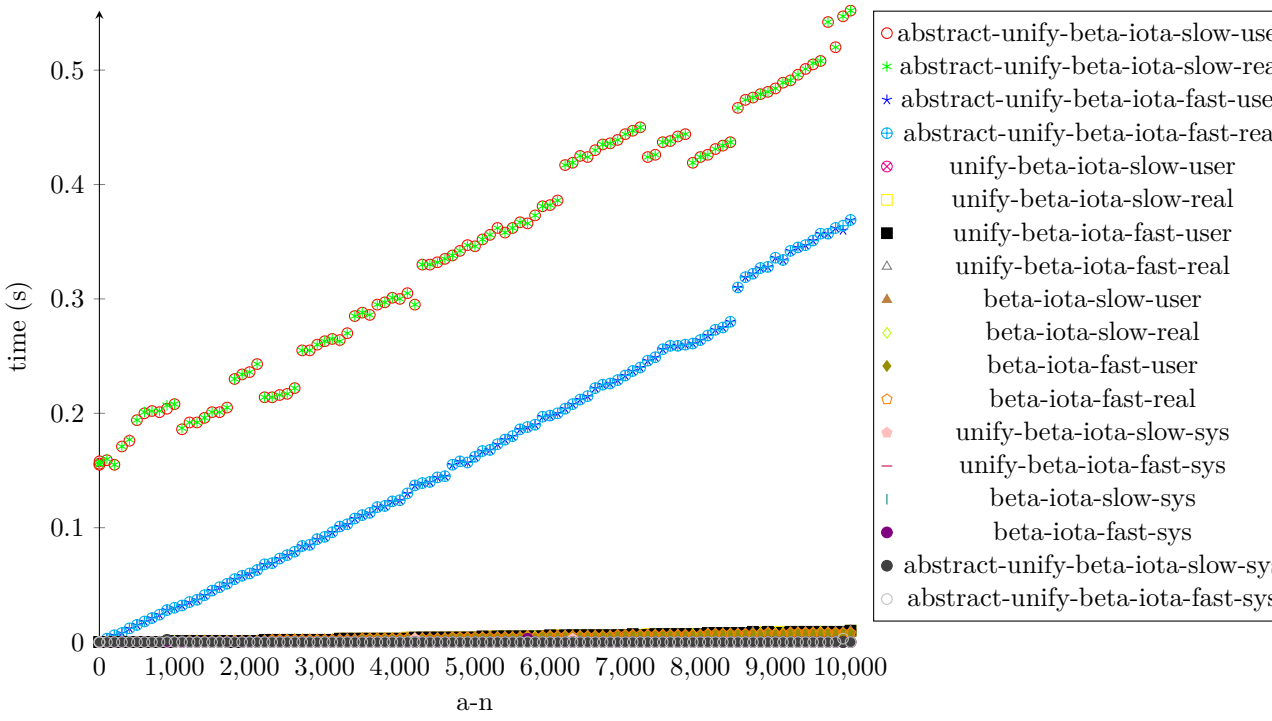


Figure 40: timing-iota-reduction-with-abstract-fact8 param-fact-n 8

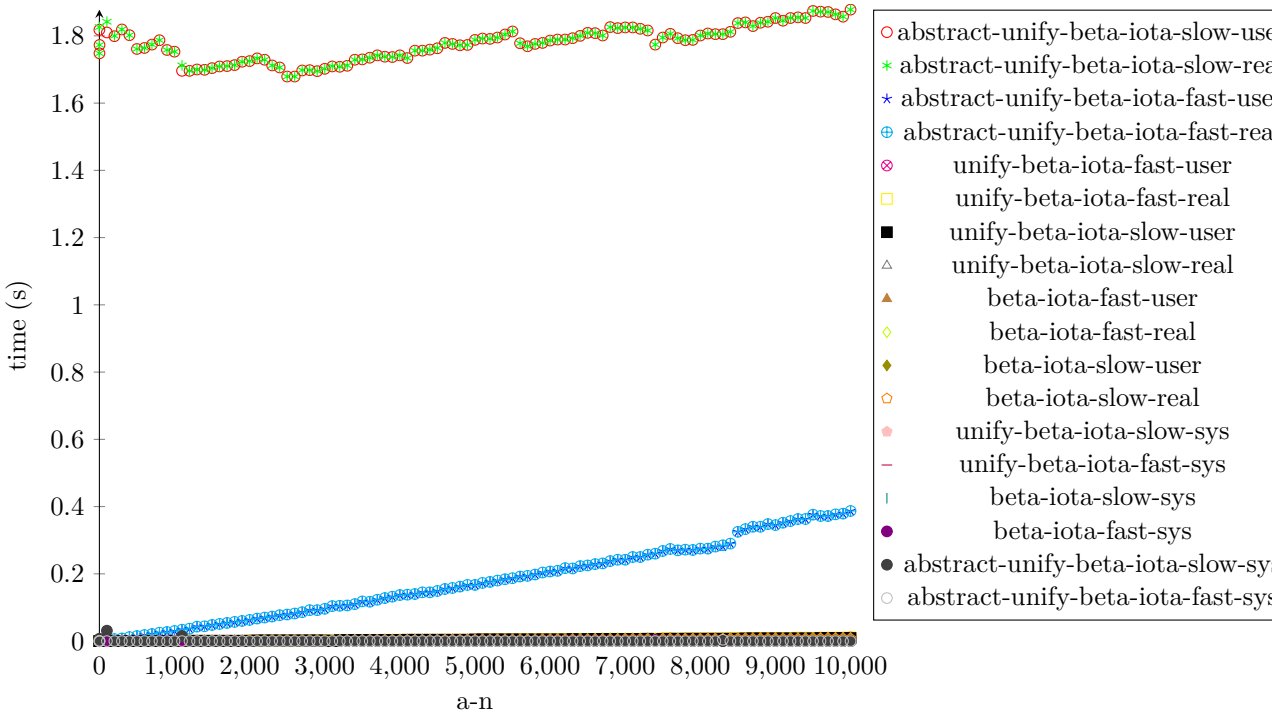


Figure 41: timing-iota-reduction-with-abstract-fact9 param-fact-n 9

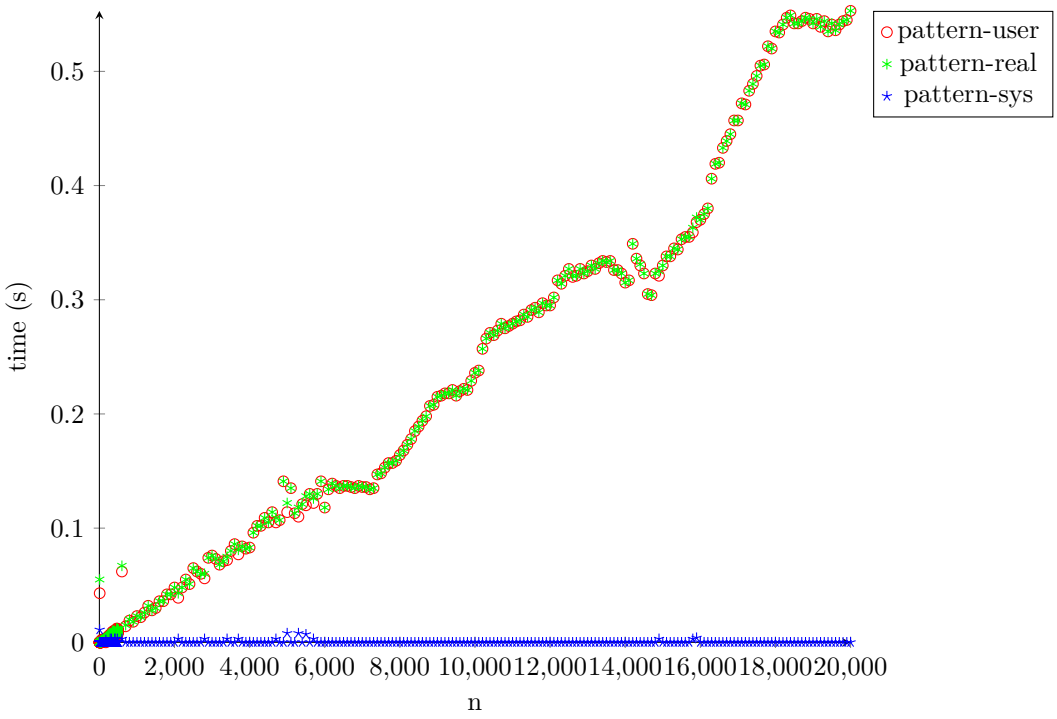


Figure 42: timing-pattern

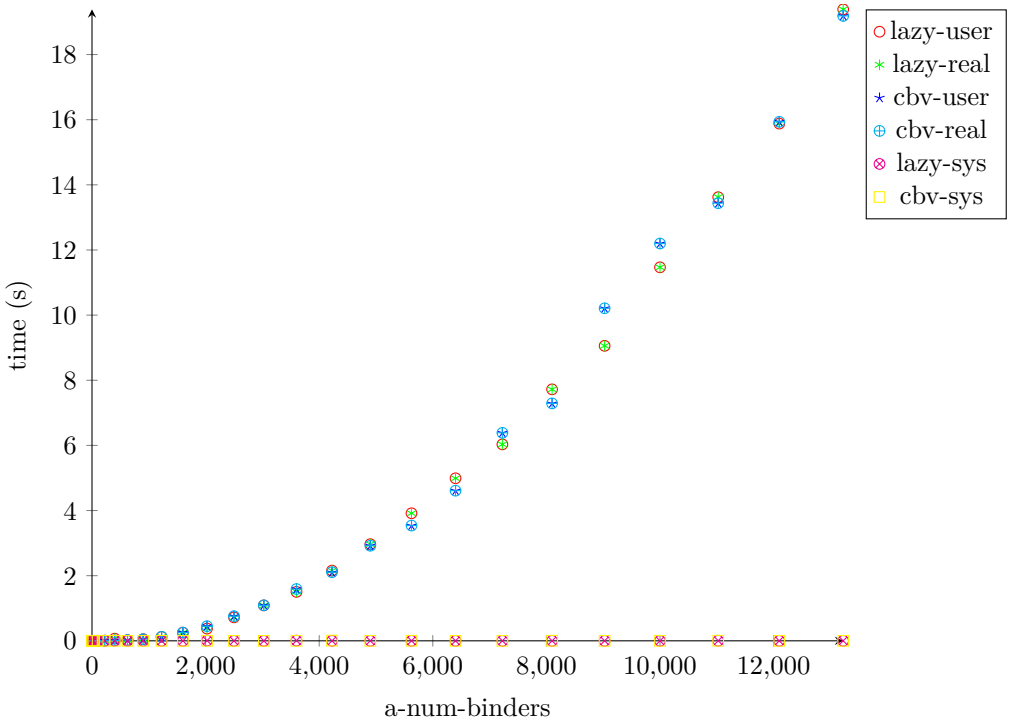


Figure 43: timing-quadratic-cbv-lazy-PHOAS param-n 0

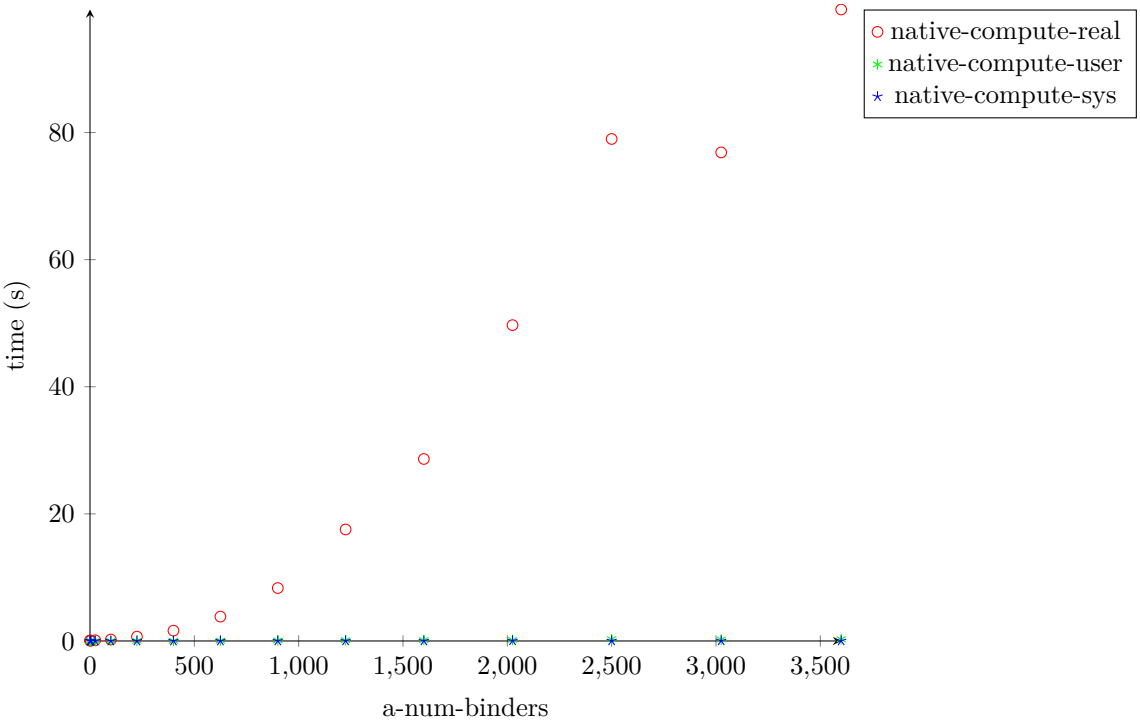


Figure 44: timing-quadratic-native-PHOAS param-n 0

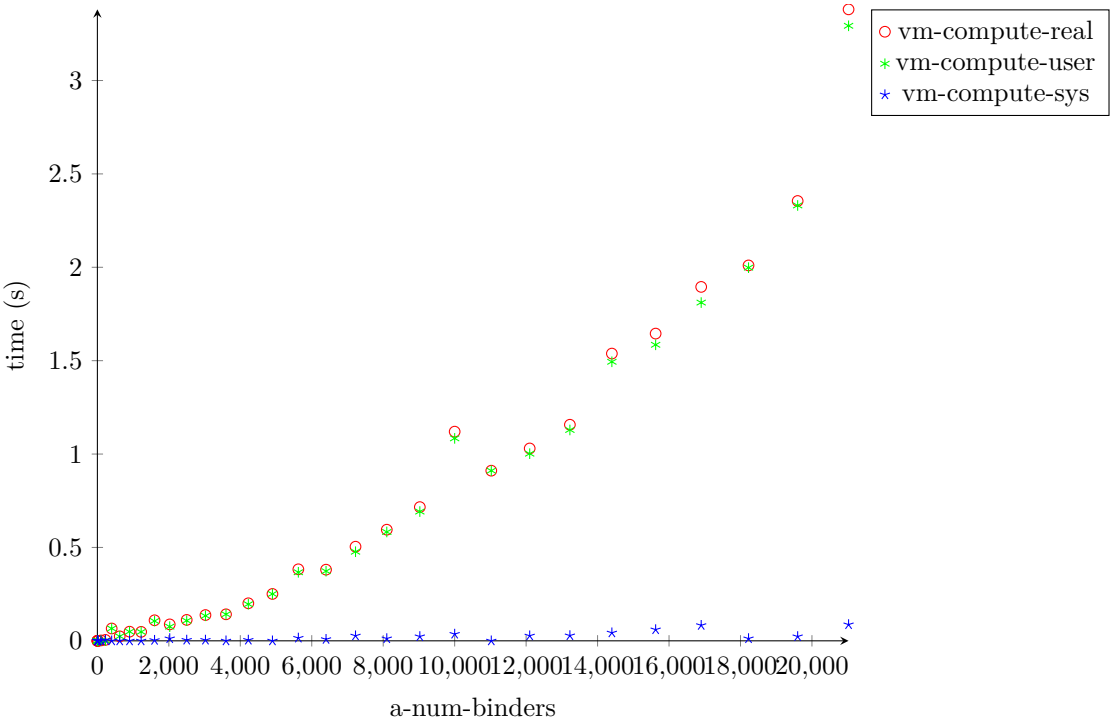


Figure 45: timing-quadratic-vm-PHOAS param-n 0