

Figure 1: Timing of rewrite_strat and setoid_rewrite under binders

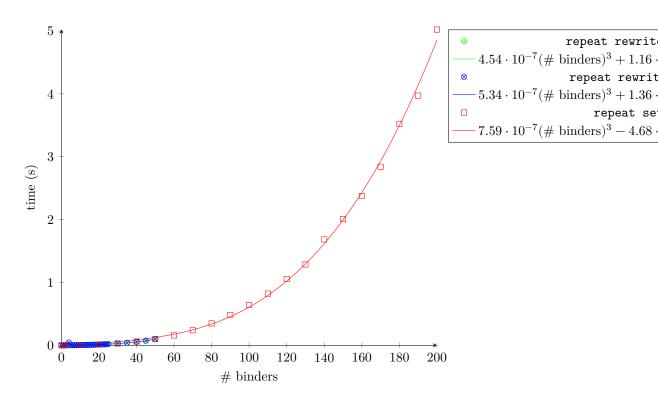
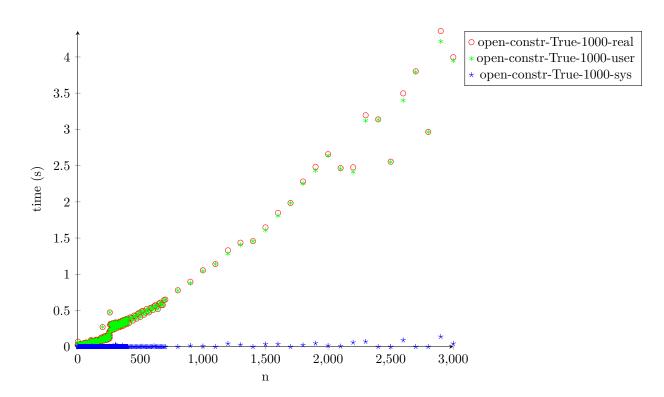
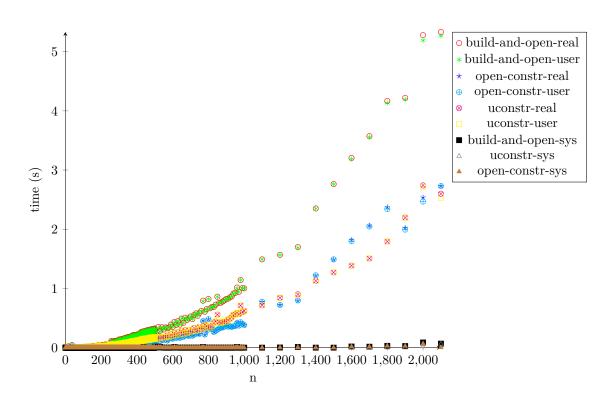


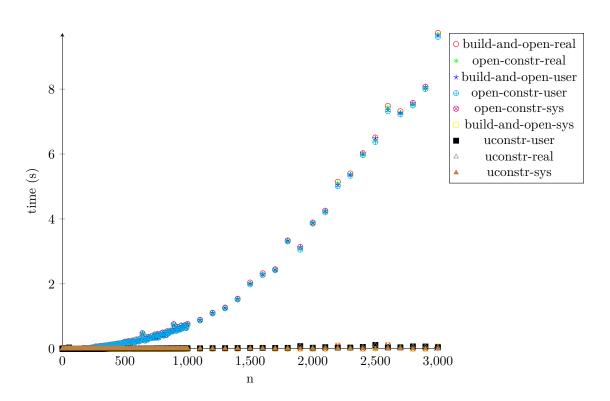
Figure 2: Timing of rewrite_strat and setoid_rewrite under binders



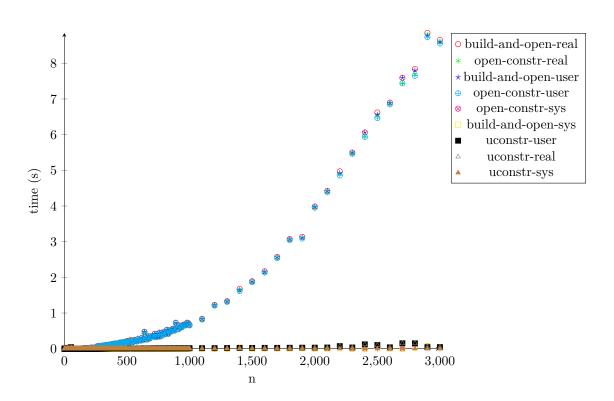
 $\label{eq:Figure 3: timing-do-n-open-constr-True} Figure \ 3: \ timing-do-n-open-constr-True$



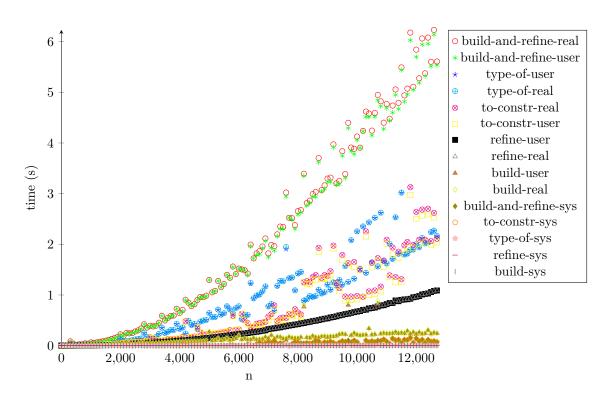
Figure~4:~timing-open-constr-n-lambda-no-types-different-names



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



 $\label{prop:constr-n-lambda-no-types-same-names} Figure \ 6: \ timing-open-constr-n-lambda-no-types-same-names$



Figure~7:~timing-app-n-uconstr

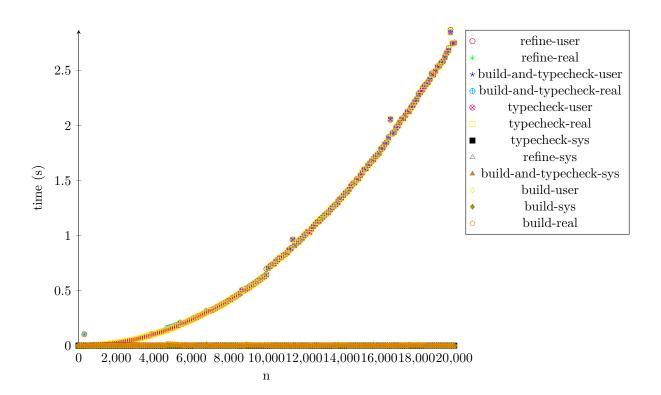


Figure 8: timing-app-n-ltac2 $\,$

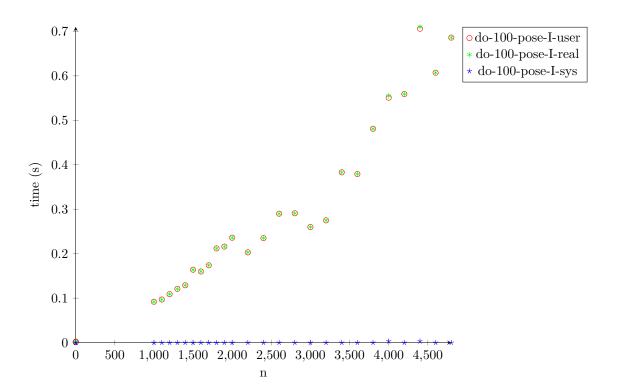


Figure 9: timing-do-n-pose

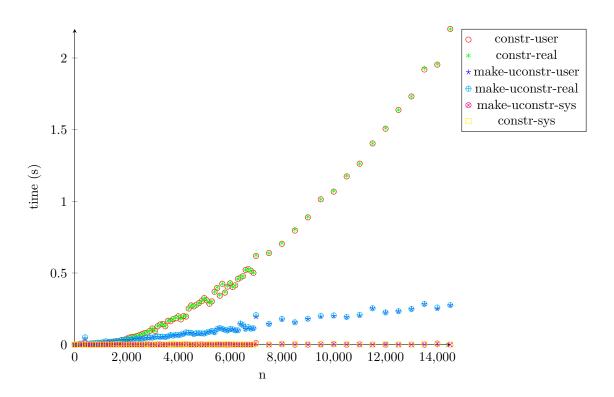


Figure 10: timing-let-n-uconstr

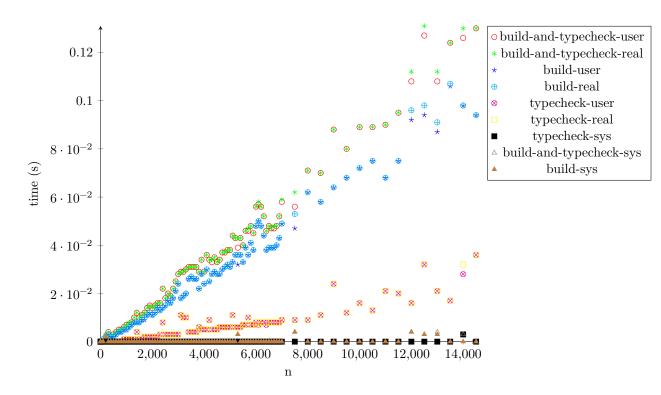
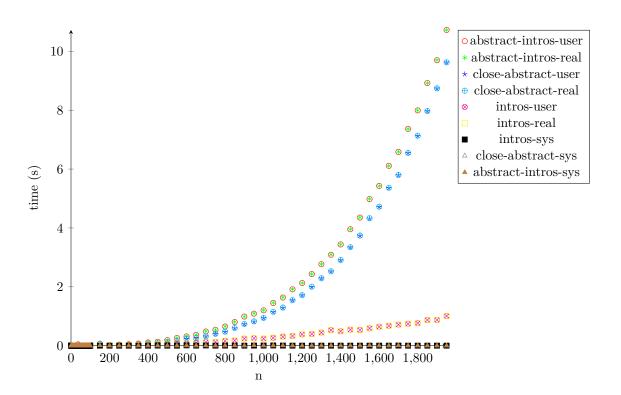


Figure 11: timing-let-n-ltac 2



Figure~12:~timing-intros-n-let

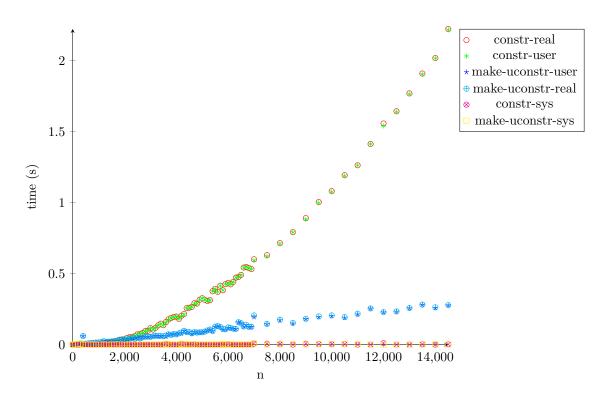


Figure 13: timing-fun-n-uconstr

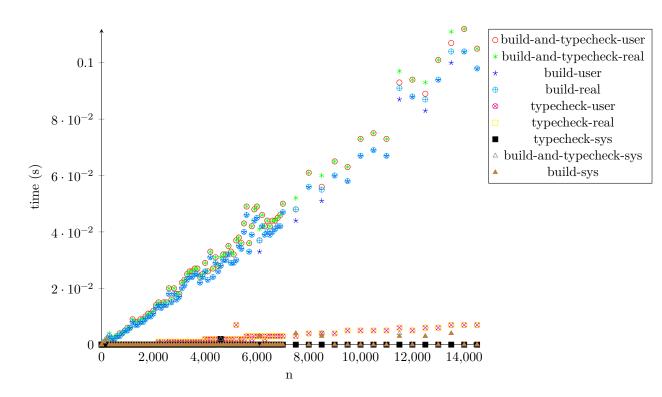


Figure 14: timing-fun-n-ltac2

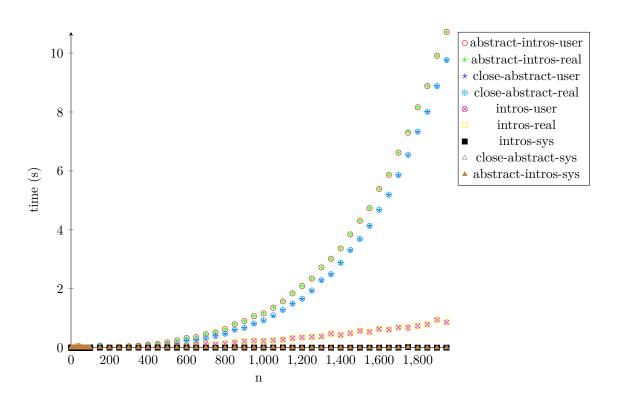
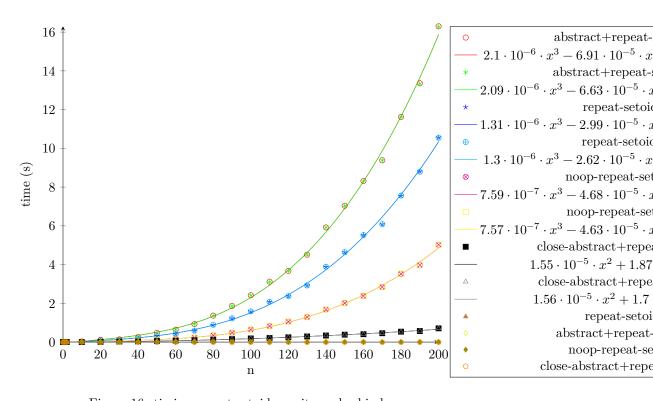
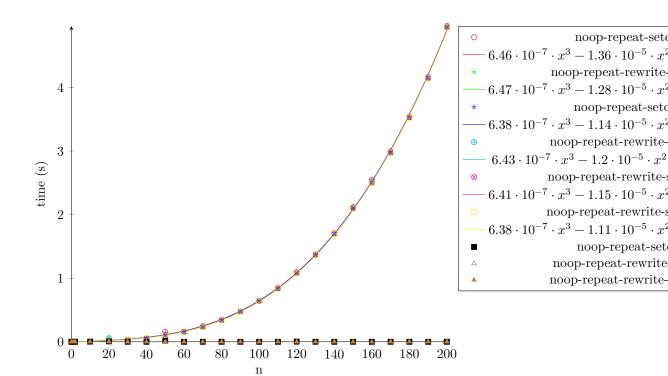


Figure 15: timing-intros-n-fun



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



 $Figure~17:~timing\mbox{-repeat-setoid-rewrite-under-binders-noop}$

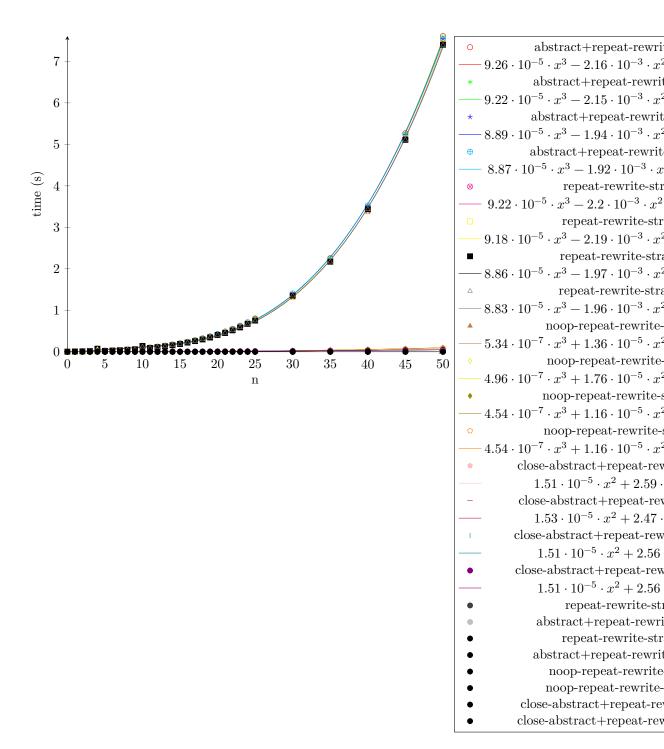
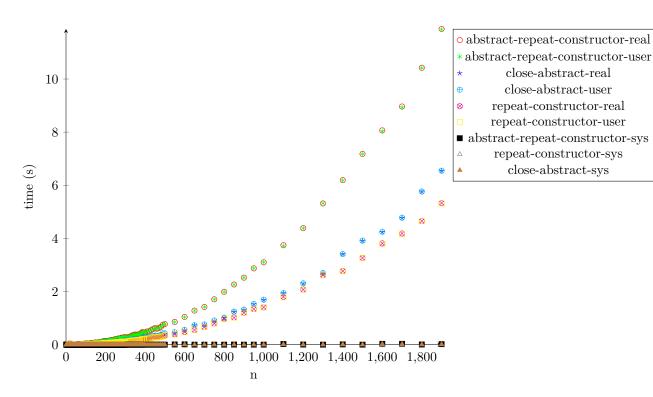


Figure 18: timing-rewrite-strat-under-binders



 ${\it close-abstract-real}$

close-abstract-user ${\bf repeat\text{-}constructor\text{-}real}$ $repeat\hbox{-}constructor\hbox{-}user$

repeat-constructor-sys

 ${\it close-abstract-sys}$

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

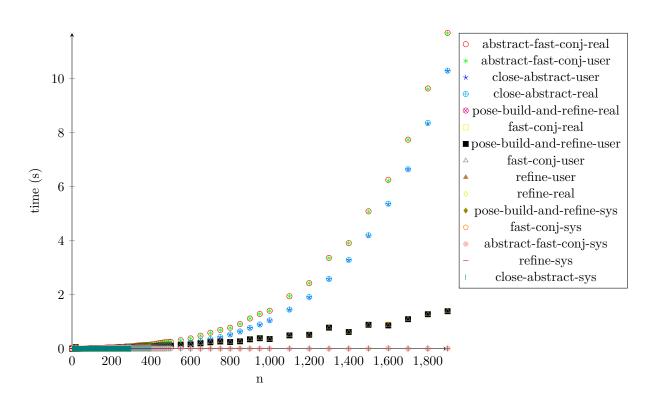


Figure 20: timing-conj-True-fast-conj

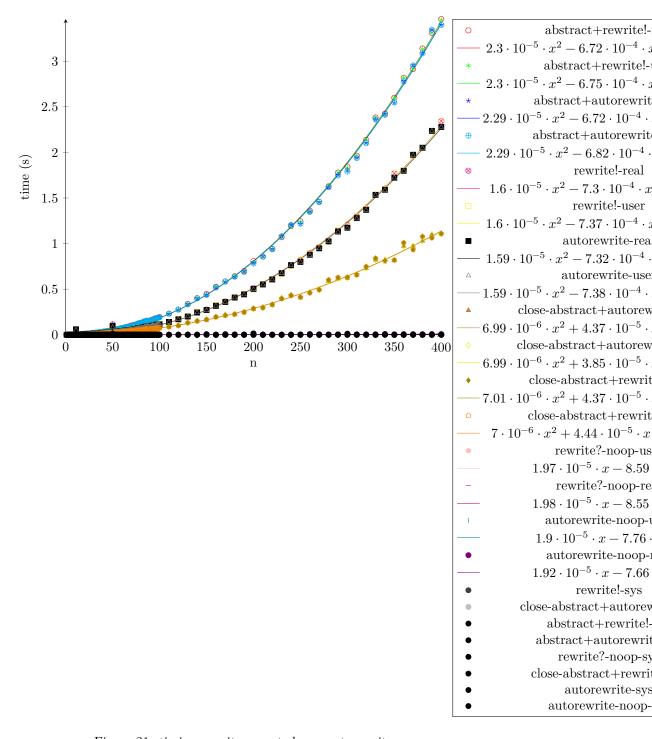


Figure 21: timing-rewrite-repeated-app-autorewrite

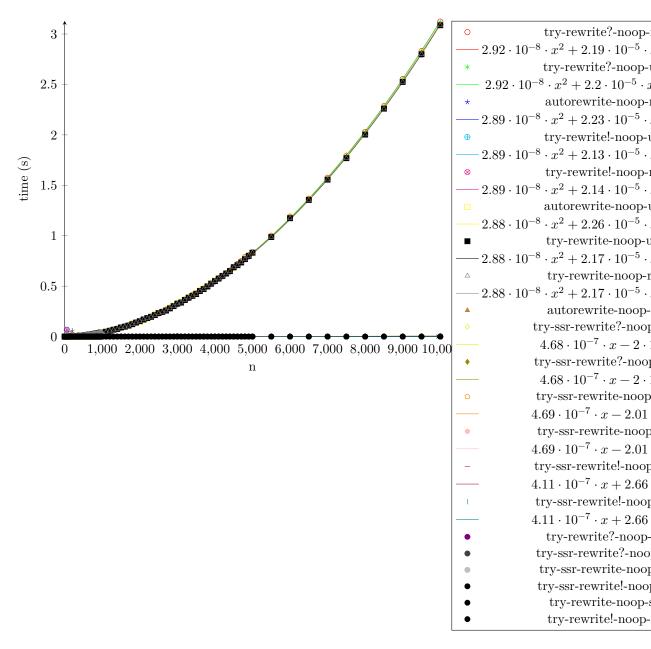


Figure 22: timing-rewrite-repeated-app-autorewrite-noop

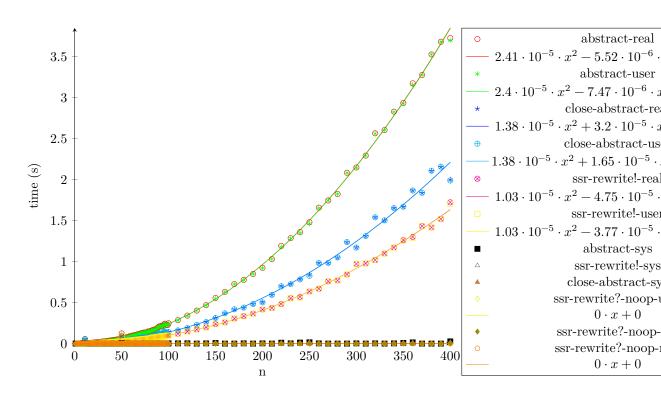


Figure 23: timing-rewrite-repeated-app-ssrrewrite

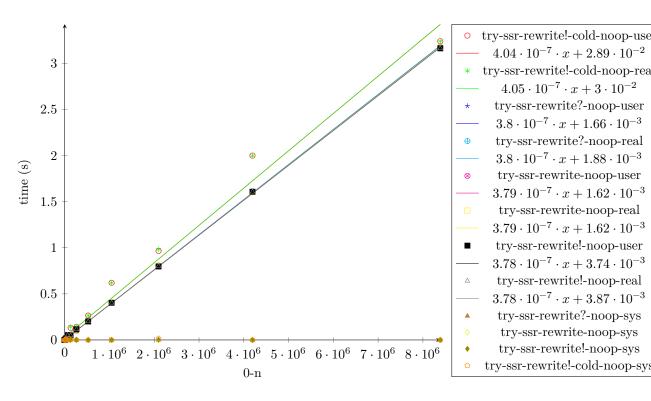
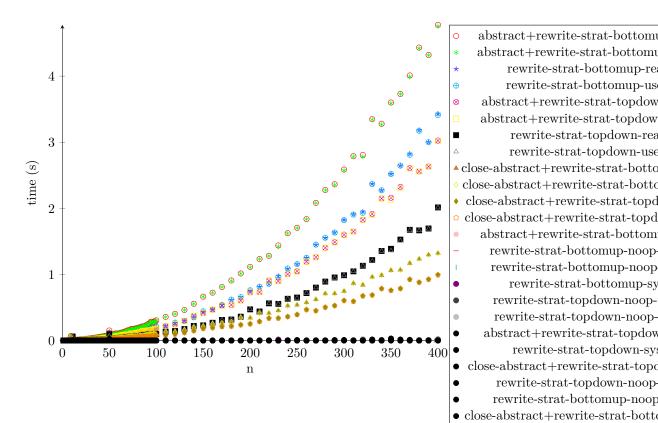


Figure 24: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$



rewrite-strat-bottomup-rea

rewrite-strat-bottomup-use

rewrite-strat-topdown-rea

rewrite-strat-topdown-use

rewrite-strat-bottomup-nooprewrite-strat-bottomup-noop

rewrite-strat-bottomup-sy rewrite-strat-topdown-nooprewrite-strat-topdown-noop-

rewrite-strat-topdown-sys

rewrite-strat-topdown-nooprewrite-strat-bottomup-noop

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

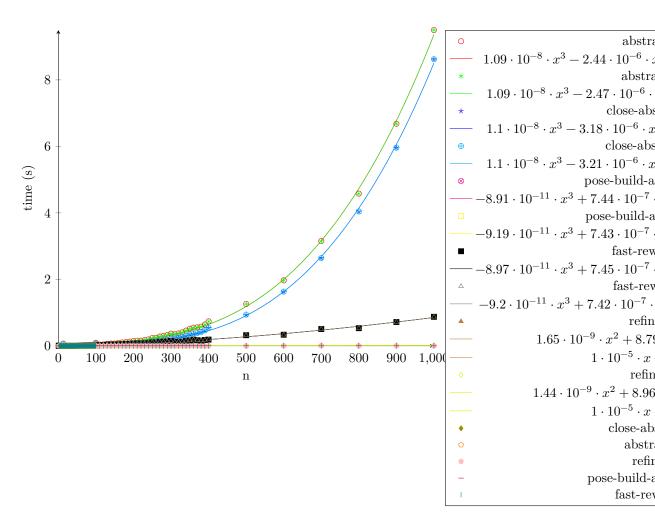
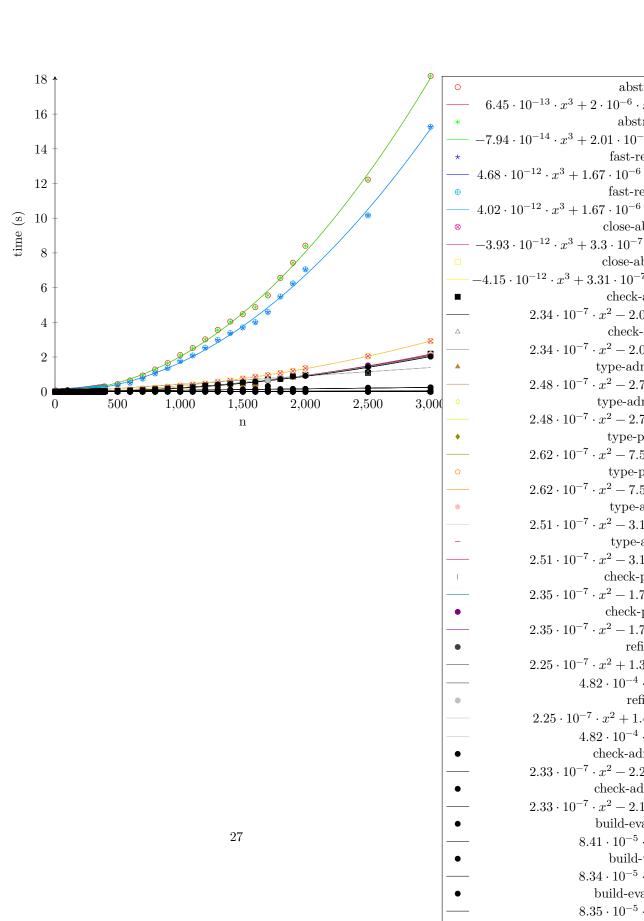


Figure 26: timing-rewrite-repeated-app-fast-rewrite



abst

abst

fast-re

fast-re

close-al

close-al

check-

check-

type-adr

type-adı

type-p

type-p

type-a

type-a

check-p

check-p

 $4.82\cdot 10^{-4} \cdot$

 $4.82 \cdot 10^{-4}$ check-ad:

check-ad

build-eva

 $8.41 \cdot 10^{-5}$ build-1 $8.34\cdot 10^{-5} \cdot$ build-eva $8.35 \cdot 10^{-5}$ build-t $8.28\cdot 10^{-5} \cdot$

refi

refi

 $2.34 \cdot 10^{-7} \cdot x^2 - 2.0$

 $2.34 \cdot 10^{-7} \cdot x^2 - 2.0$

 $2.48 \cdot 10^{-7} \cdot x^2 - 2.7$

 $2.48 \cdot 10^{-7} \cdot x^2 - 2.7$

 $2.62 \cdot 10^{-7} \cdot x^2 - 7.5$

 $2.62 \cdot 10^{-7} \cdot x^2 - 7.5$

 $2.51 \cdot 10^{-7} \cdot x^2 - 3.1$

 $2.51 \cdot 10^{-7} \cdot x^2 - 3.1$

 $2.35 \cdot 10^{-7} \cdot x^2 - 1.7$

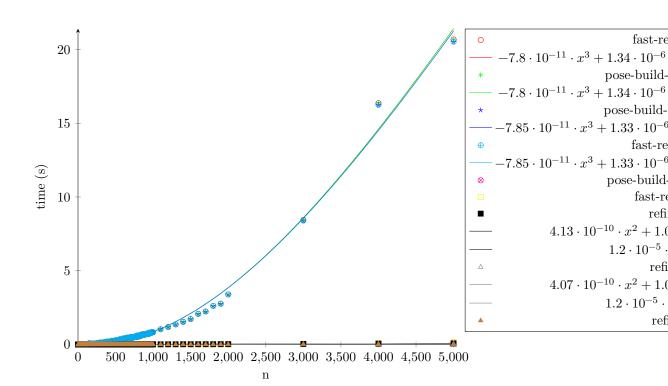
 $2.35 \cdot 10^{-7} \cdot x^2 - 1.7$

 $2.25 \cdot 10^{-7} \cdot x^2 + 1.3$

 $2.25 \cdot 10^{-7} \cdot x^2 + 1.4$

 $2.33 \cdot 10^{-7} \cdot x^2 - 2.2$

 $2.33\cdot 10^{-7}\cdot x^2 - 2.1$



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

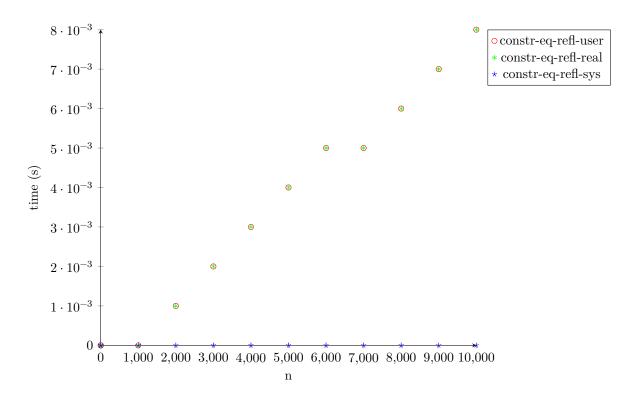


Figure 29: timing-constr-eq-alpha

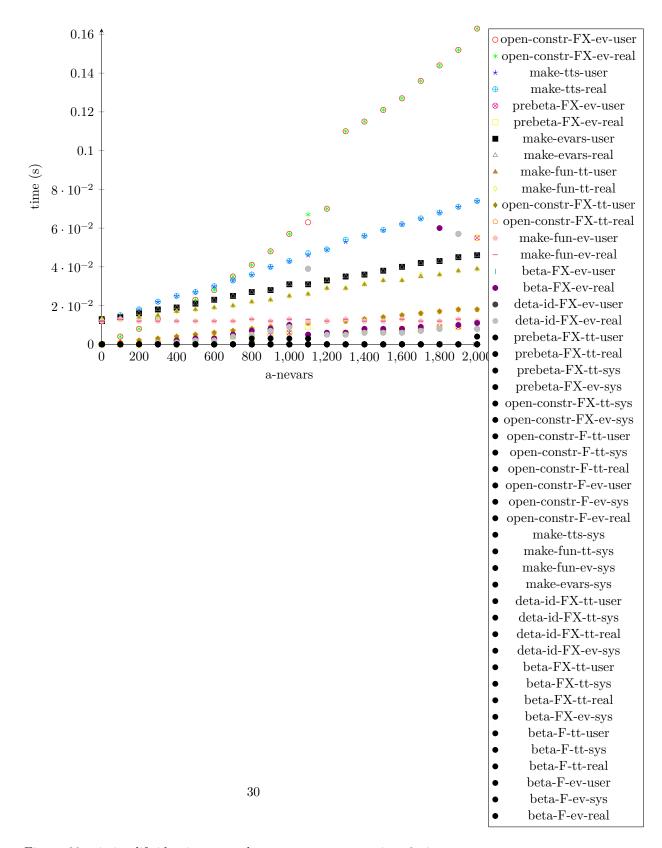


Figure 30: timing-lift-identity-evar-subst-nevars param-ctx-size $\ 0,\ 1,\$ param-extra-binders $\ 0,\ 1$

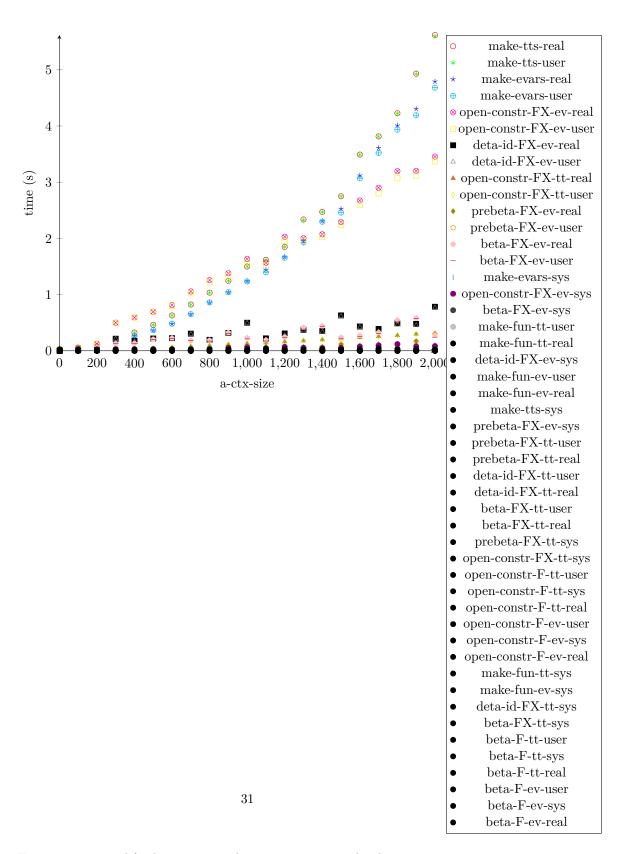


Figure 31: timing-lift-identity-evar-subst-ctx param-extra-binders $\ 0, \ 1, \ param-evars \ 0, \ 1$

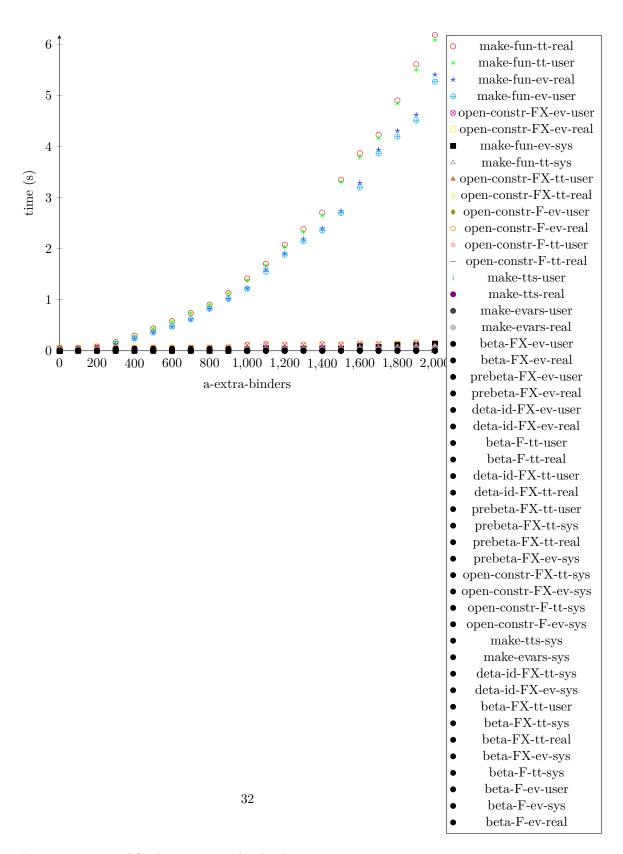


Figure 32: timing-lift-identity-evar-subst-binders param-ctx-size $\ 0,\ 1,\$ param-nevars $\ 0,\ 1$

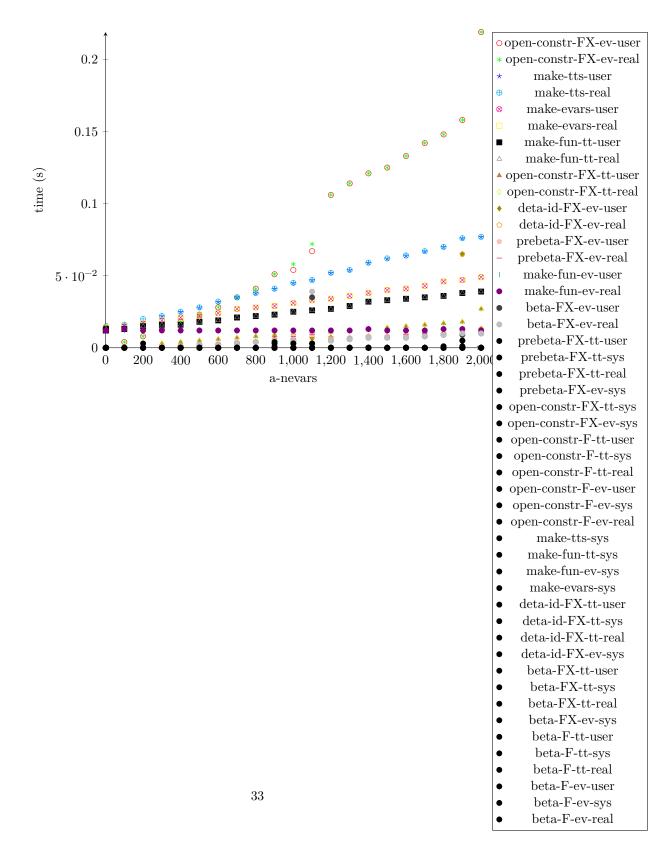


Figure 33: timing-lift-non-identity-evar-subst-nevars param-ctx-size $0,\ 1,$ param-extra-binders $0,\ 1$

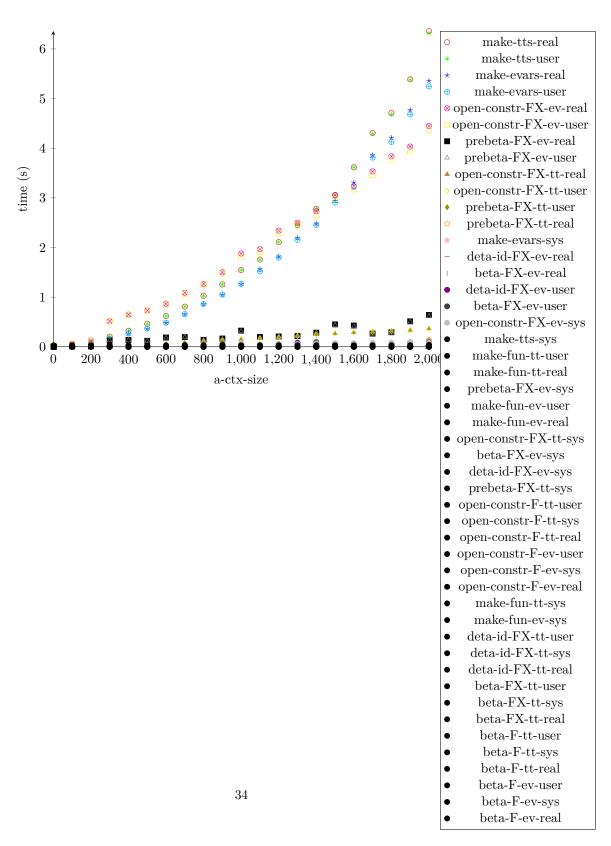


Figure 34: timing-lift-non-identity-evar-subst-ctx param-extra-binders 0, param-nevars 0, 1

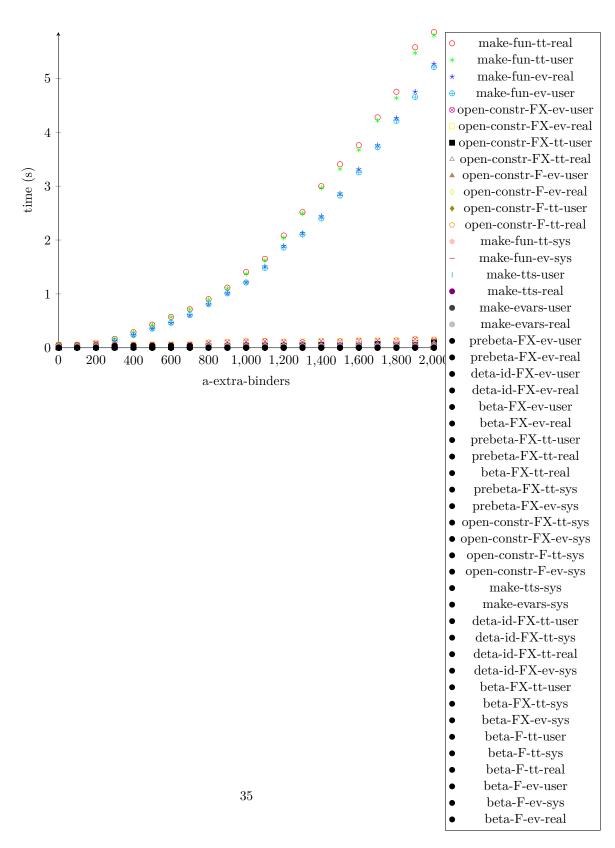
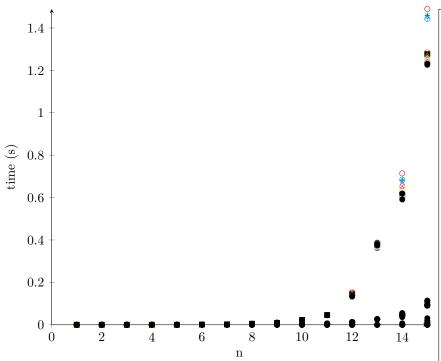
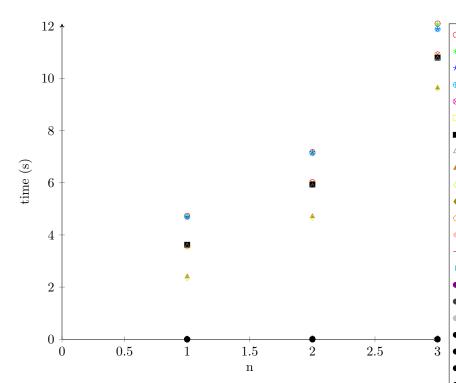


Figure 35: timing-lift-non-identity-evar-subst-binders param-ctx-size 0, 1, param-nevars 0, 1



o unify-delta-1-fast-real * unify-delta-1-slow-real \star 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 o 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 \bullet 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 $beta\hbox{-}2\hbox{-}fast\hbox{-}real$ 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



o 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 \triangle 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-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-real unify-delta-1-fast-user

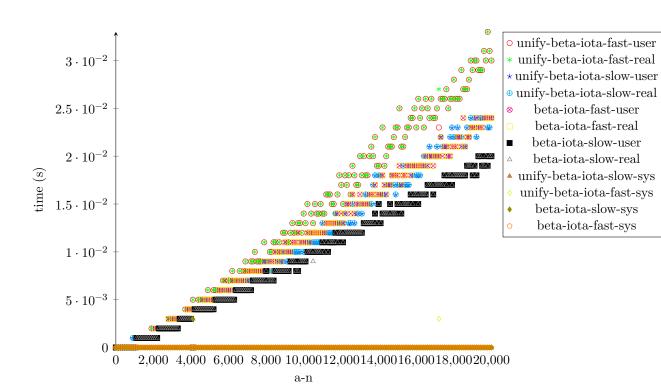


Figure 38: timing-iota-reduction-fact8 param-fact-n $\,\,8\,$

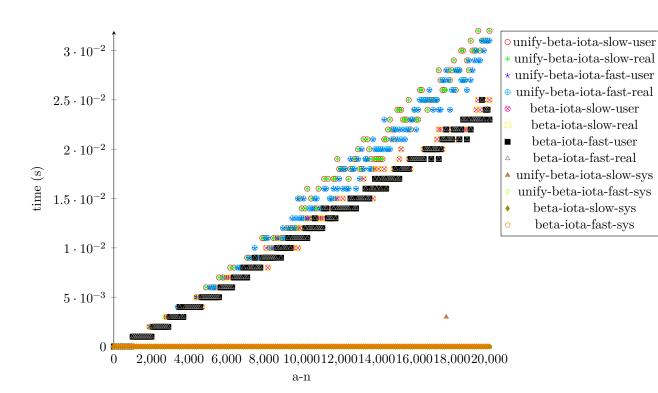


Figure 39: timing-iota-reduction-fact9 param-fact-n $\ 9$

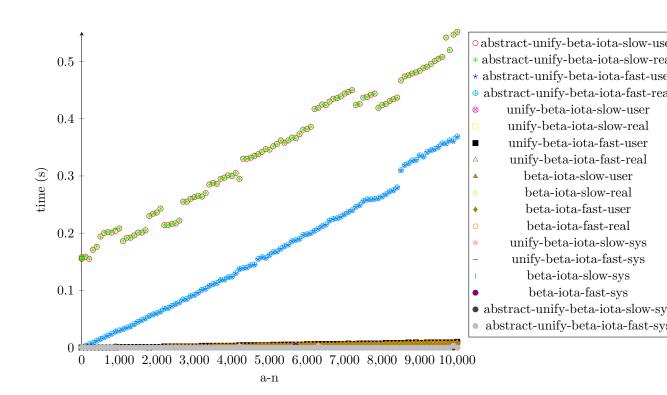


Figure 40: timing-iota-reduction-with-abstract-fact8 param-fact-n $\,\,8\,$

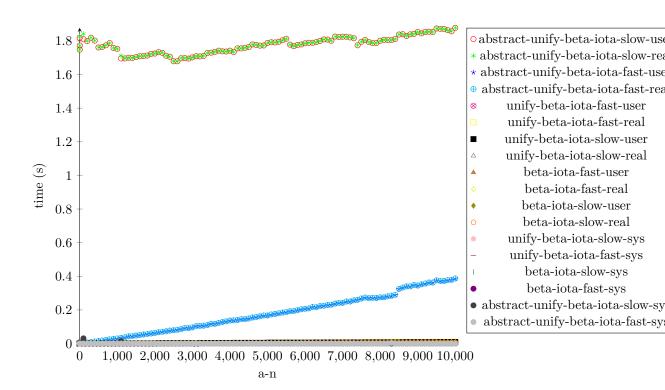


Figure 41: timing-iota-reduction-with-abstract-fact9 param-fact-n $\,\,9$

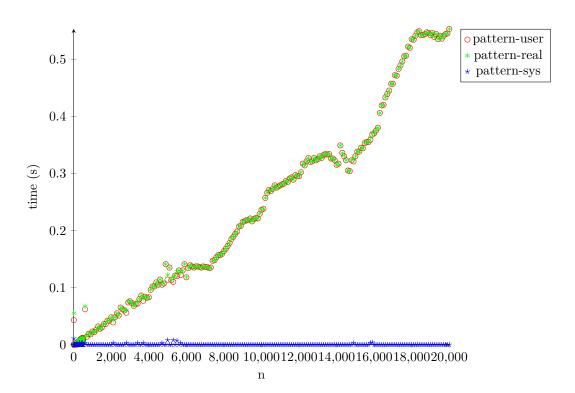


Figure 42: timing-pattern

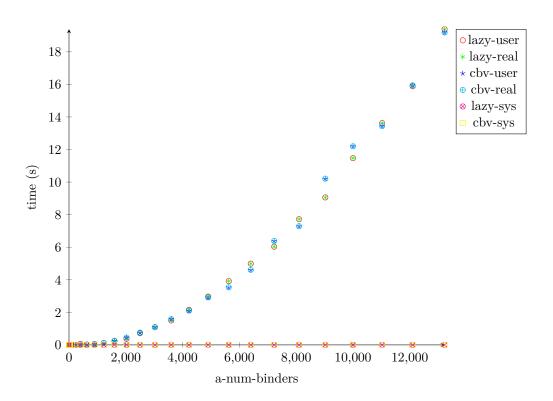


Figure 43: timing-quadratic-cbv-lazy-PHOAS param-n $\,\,0\,\,$

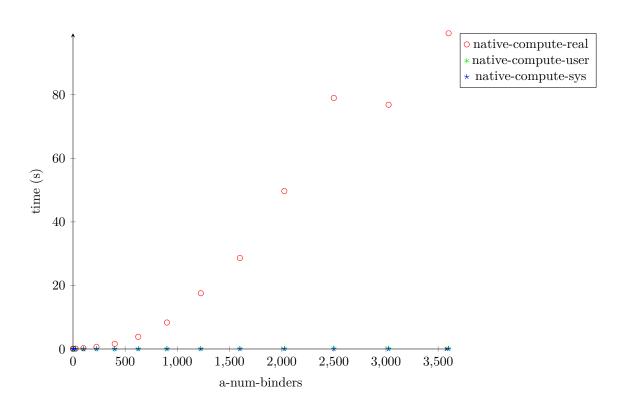


Figure 44: timing-quadratic-native-PHOAS param-n $\,0\,$

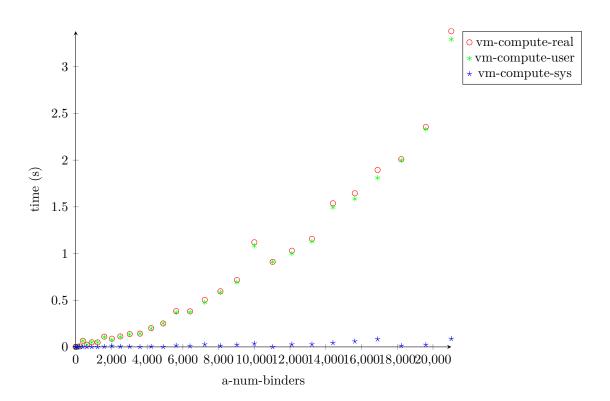


Figure 45: timing-quadratic-vm-PHOAS param-n $\,0\,$