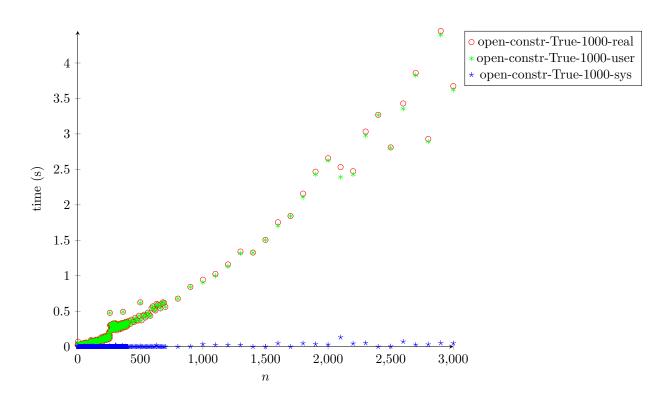
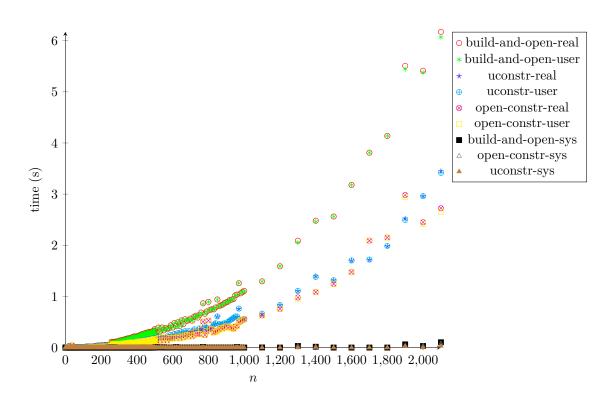


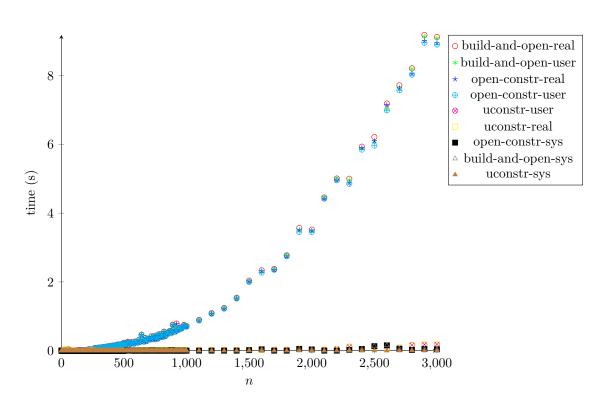
Figure 1: Timing of rewrite_strat and setoid_rewrite under binders



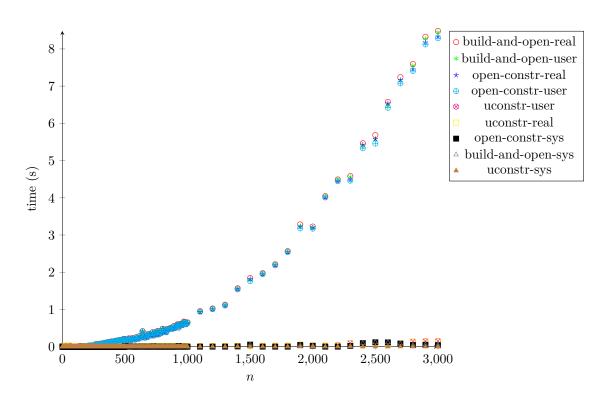
 $\label{eq:Figure 2: timing-do-n-open-constr-True} Figure \ 2: \ timing-do-n-open-constr-True$



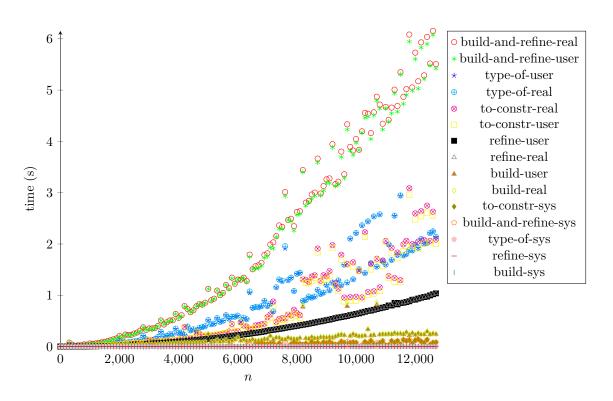
Figure~3:~timing-open-constr-n-lambda-no-types-different-names



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



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



 $\label{eq:Figure 6: timing-app-n-uconstr} Figure \ 6: \ timing-app-n-uconstr$

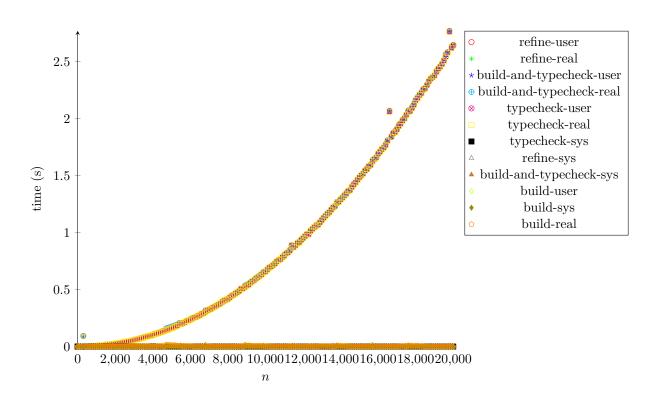


Figure 7: timing-app-n-ltac2 $\,$

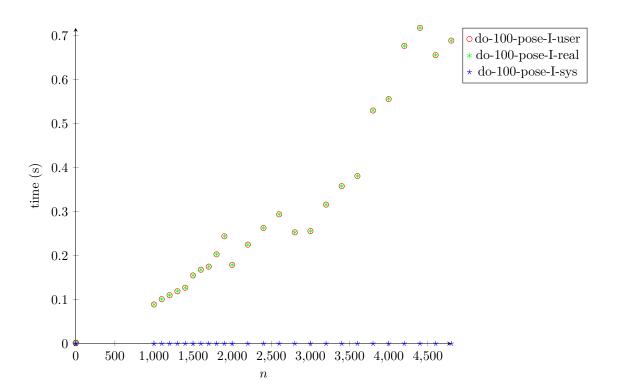


Figure 8: timing-do-n-pose

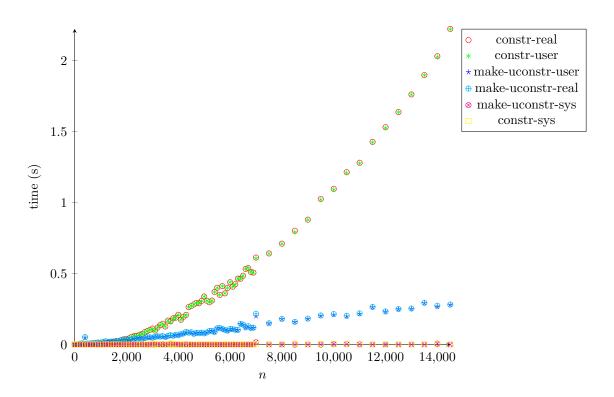


Figure 9: timing-let-n-uconstr

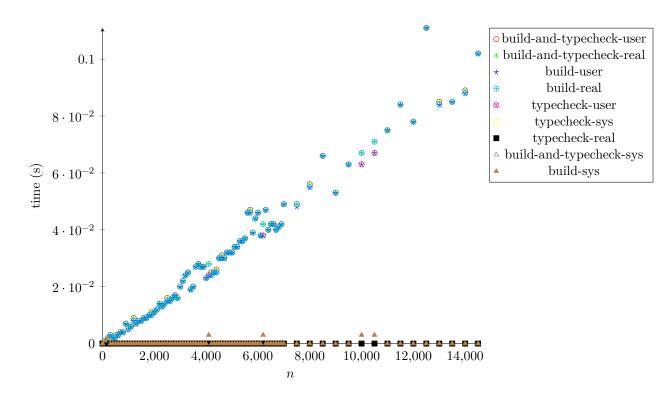
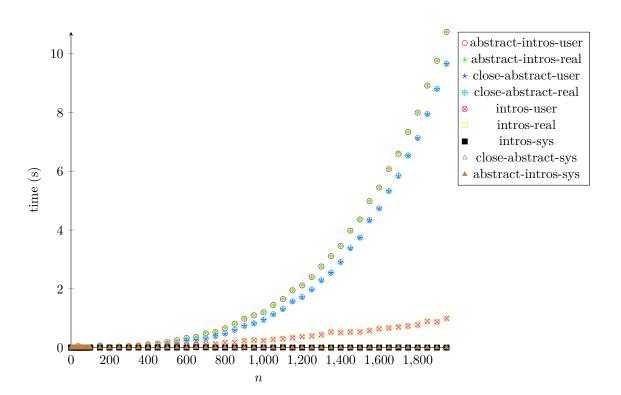


Figure 10: timing-let-n-ltac 2



Figure~11:~timing-intros-n-let

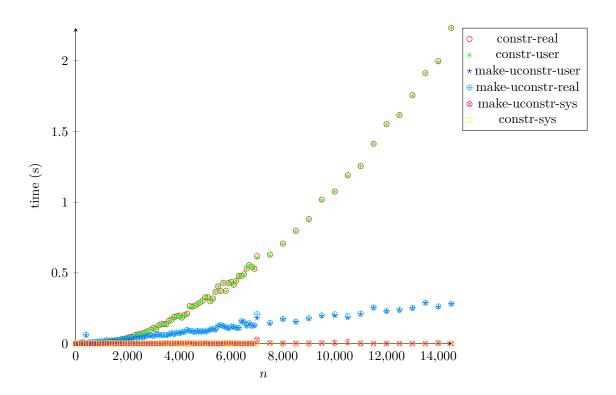


Figure 12: timing-fun-n-uconstr

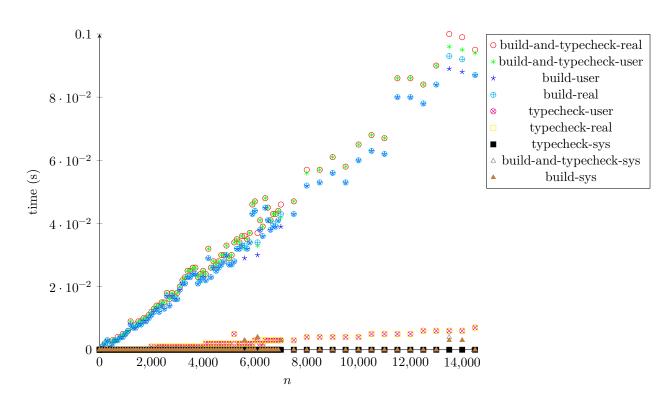


Figure 13: timing-fun-n-ltac2

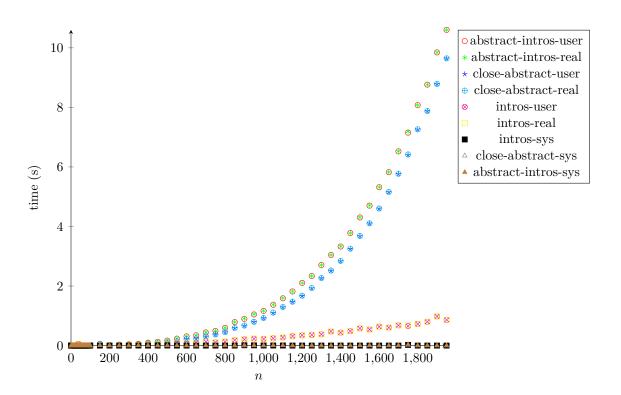
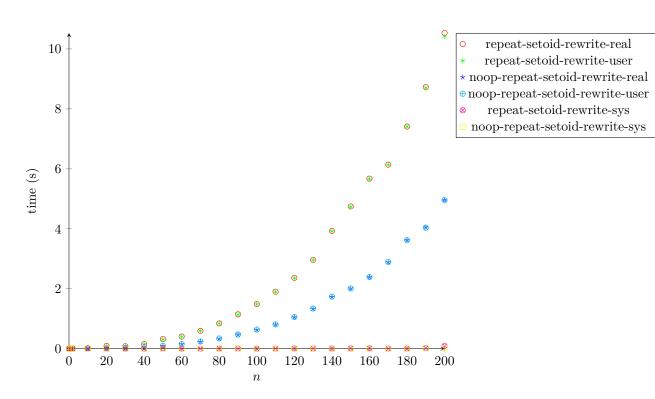
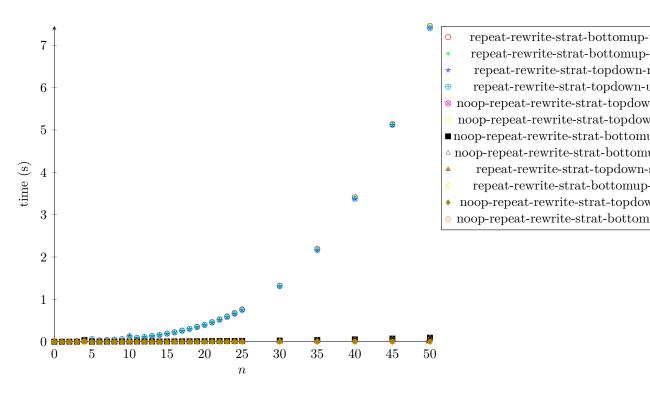


Figure 14: timing-intros-n-fun



 $Figure~15:~timing\mbox{-repeat-setoid-rewrite-under-binders}$



repeat-rewrite-strat-bottomup-

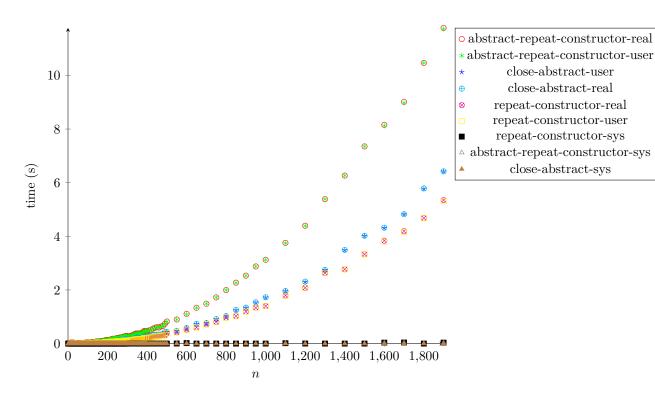
repeat-rewrite-strat-bottomuprepeat-rewrite-strat-topdown-r

repeat-rewrite-strat-topdown-u

repeat-rewrite-strat-topdown-

repeat-rewrite-strat-bottomup-

 $Figure~16:~timing\mbox{-rewrite-strat-under-binders}$



close-abstract-user

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

repeat-constructor-sys

 ${\it close-abstract-sys}$

Figure 17: timing-conj-True-repeat-constructor

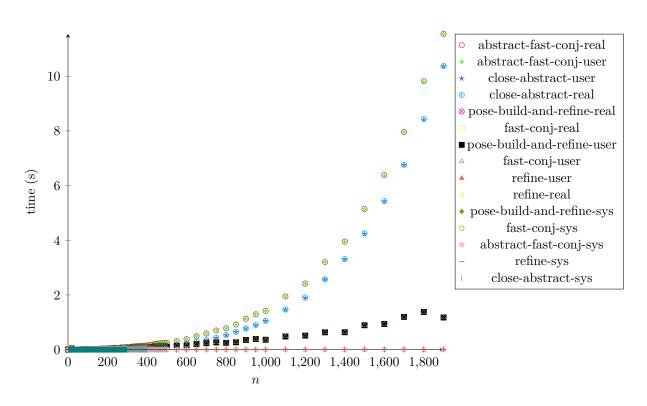
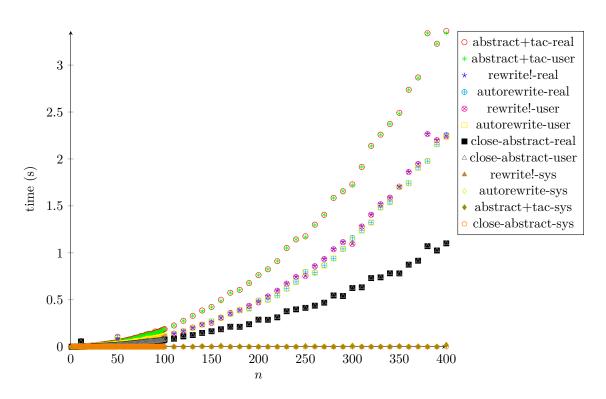


Figure 18: timing-conj-True-fast-conj



Figure~19:~timing-rewrite-repeated-app-autorewrite

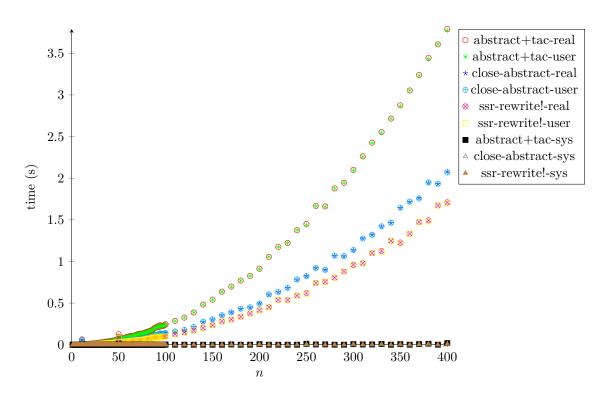
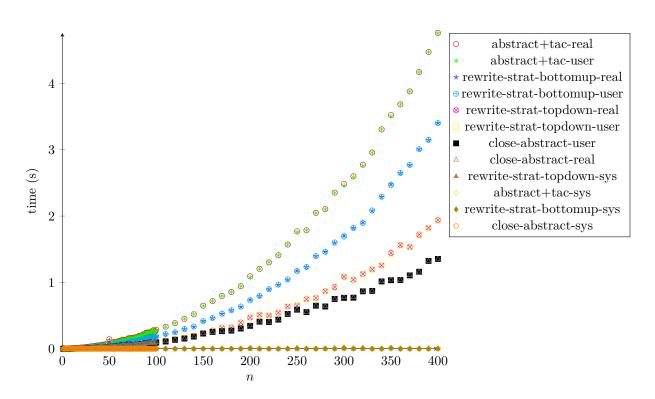


Figure 20: timing-rewrite-repeated-app-ssrrewrite



 $Figure\ 21:\ timing-rewrite-repeated-app-rewrite-strat$

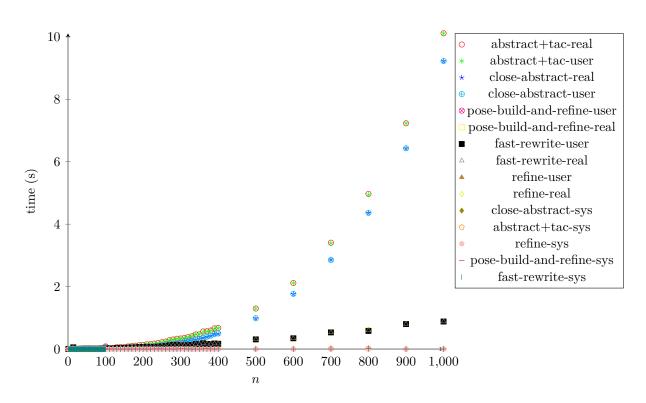


Figure 22: timing-rewrite-repeated-app-fast-rewrite

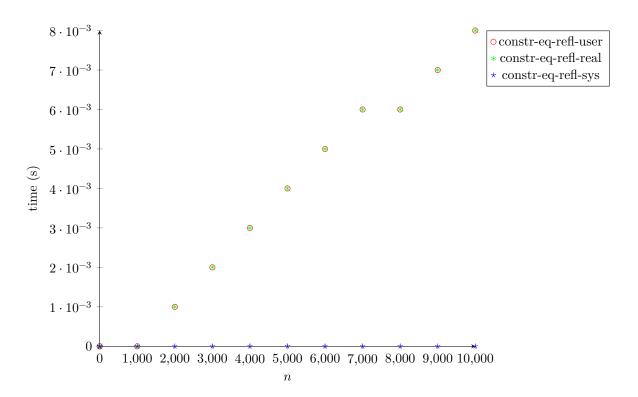


Figure 23: timing-constr-eq-alpha

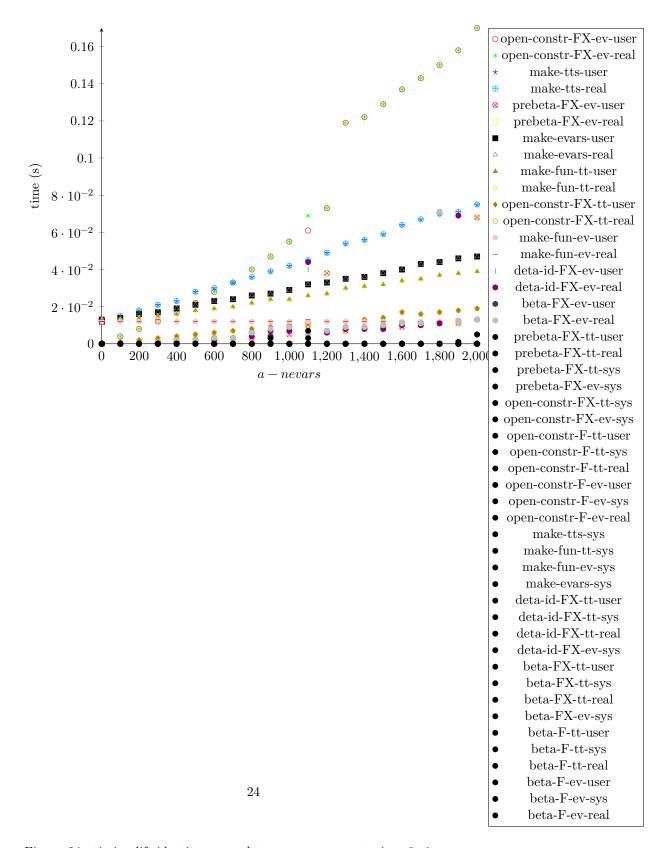


Figure 24: timing-lift-identity-evar-subst-nevars param-ctx-size $\ 0,\ 1,\ param-extra-binders\ 0,\ 1$

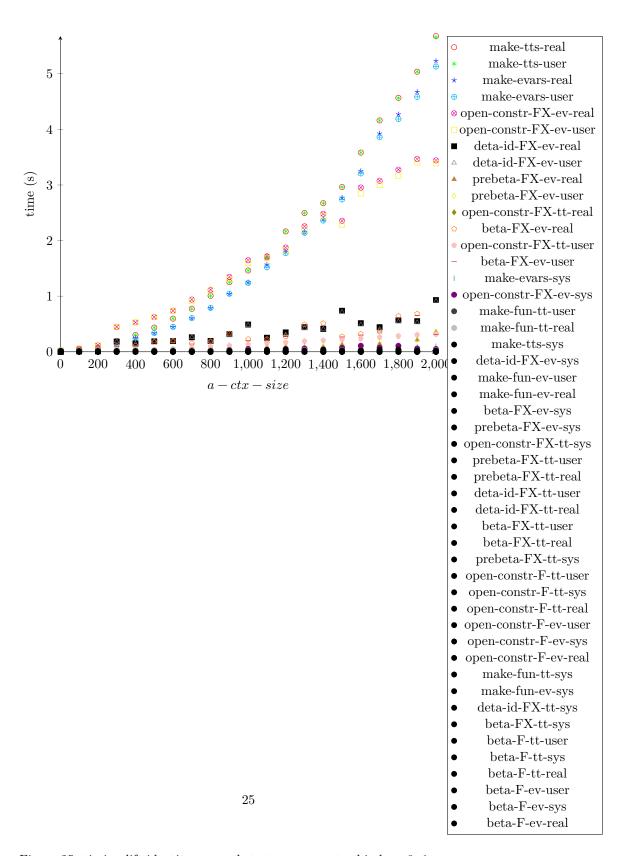


Figure 25: timing-lift-identity-evar-subst-ctx param-extra-binders $\ 0, \ 1, \ param-nevars \ 0, \ 1$

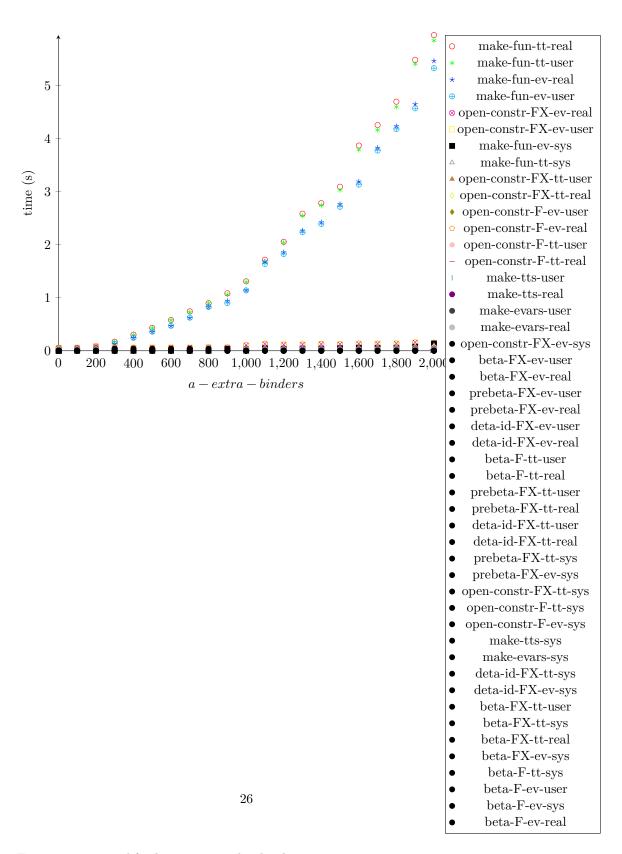


Figure 26: timing-lift-identity-evar-subst-binders param-ctx-size $\ 0,\ 1,\ param-nevars\ 0,\ 1$

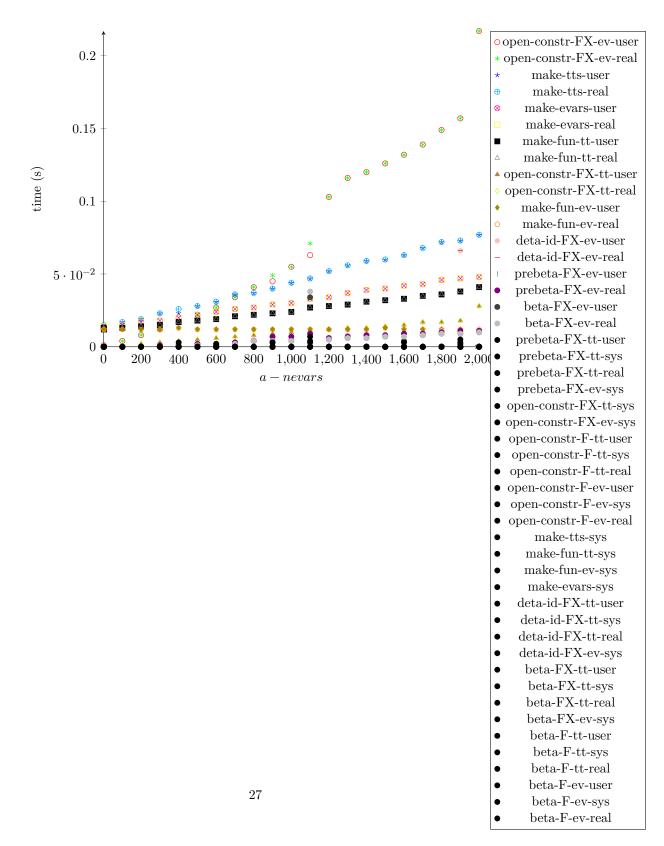


Figure 27: timing-lift-non-identity-evar-subst-nevars param-ctx-size $0,\ 1,$ param-extra-binders $0,\ 1$

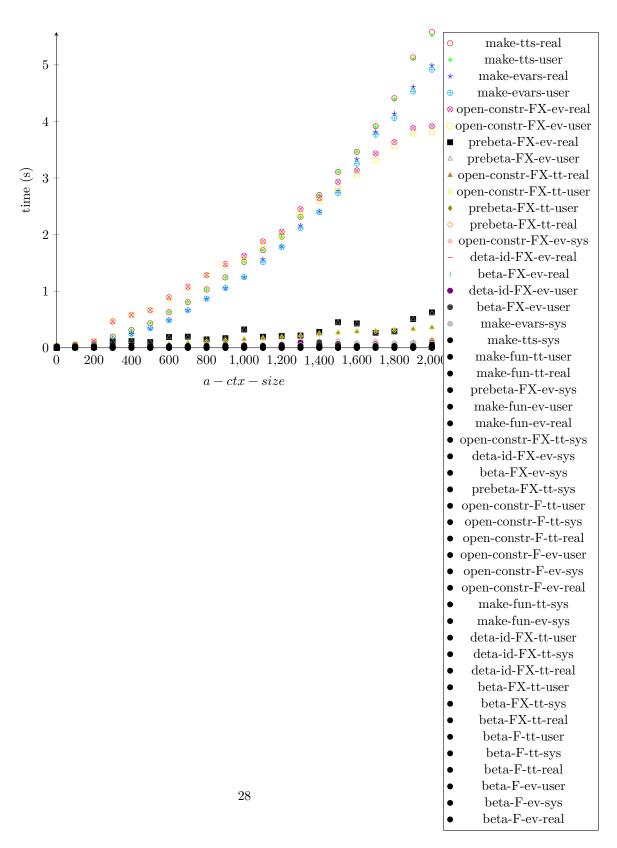


Figure 28: timing-lift-non-identity-evar-subst-ctx param-extra-binders 0, param-nevars 0, 1

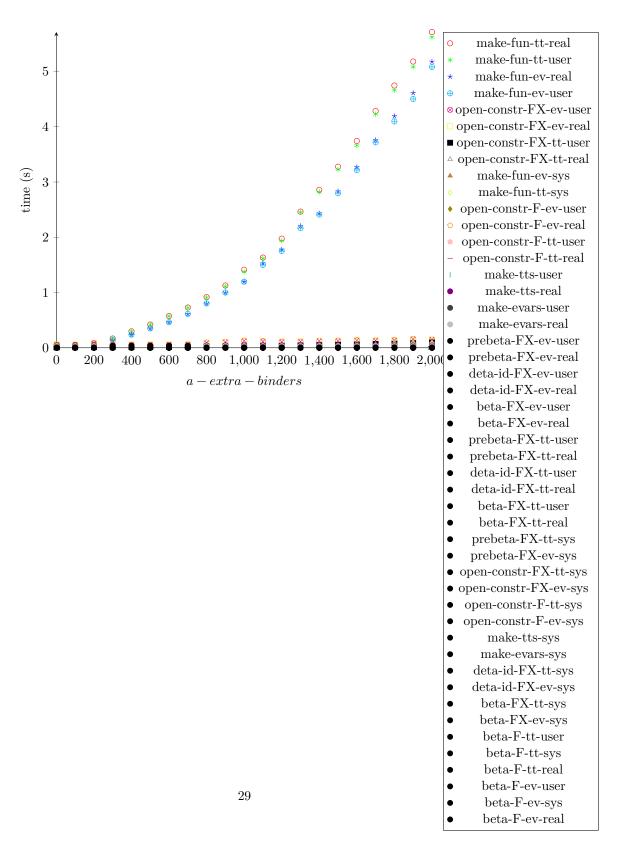
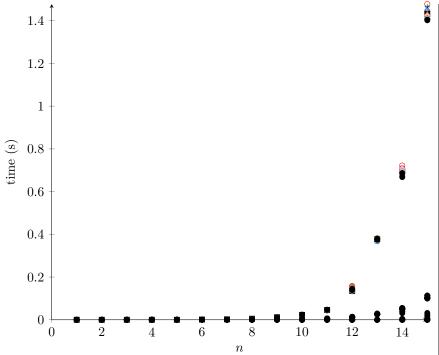


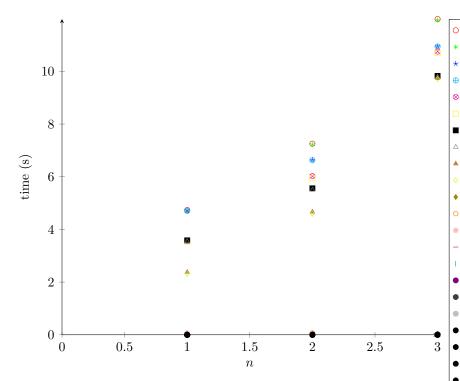
Figure 29: timing-lift-non-identity-evar-subst-binders param-ctx-size 0, 1 param-nevars 0, 1



* unify-delta-1-slow-real *unify-delta-1-slow-user • unify-delta-1-fast-user ⊗ unify-zeta-1-fast-real □ unify-zeta-2-slow-real ■ unify-zeta-1-slow-user △ unify-zeta-1-slow-real ▲ unify-zeta-2-slow-user unify-zeta-1-fast-user • unify-beta-1-fast-real o 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-beta-1-slow-user • unify-beta-1-slow-real • unify-zeta-2-fast-user unify-beta-1-fast-user delta-1-slow-user delta-1-slow-real delta-1-fast-user delta-1-fast-real beta-2-fast-user beta-2-fast-real beta-2-slow-user beta-2-slow-real beta-1-fast-user beta-1-fast-real zeta-2-slow-user zeta-2-slow-real zeta-2-fast-user zeta-2-fast-real zeta-1-fast-user zeta-1-fast-realbeta-1-slow-real zeta-1-slow-user zeta-1-slow-real beta-1-slow-user unify-delta-1-fast-sys unify-beta-1-fast-sys unify-zeta-1-fast-sys unify-zeta-2-fast-sys unify-zeta-2-slow-sys unify-delta-1-slow-sys unify-beta-2-fast-sys zeta-2-slow-sys zeta-2-fast-sys

zeta-1-slow-sys
zeta-1-fast-sys
unify-zeta-1-slow-sys
unify-beta-2-slow-sys

o unify-delta-1-fast-real



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-beta-1-slow-real □ abstract-unify-beta-1-slow-user ■ abstract-unify-zeta-1-slow-real △ abstract-unify-zeta-1-slow-user ▲ abstract-unify-delta-1-slow-real abstract-unify-delta-1-slow-user • abstract-unify-zeta-1-slow-sys • abstract-unify-beta-1-slow-sys abstract-unify-delta-1-slow-sys abstract-unify-beta-2-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-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

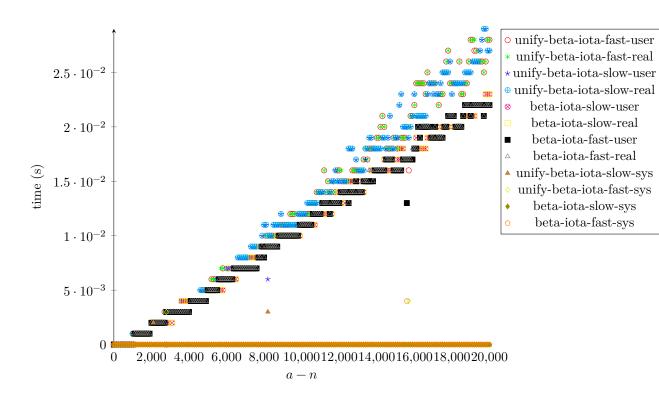


Figure 32: timing-iota-reduction-fact8 param-fact-n $\,\,8\,$

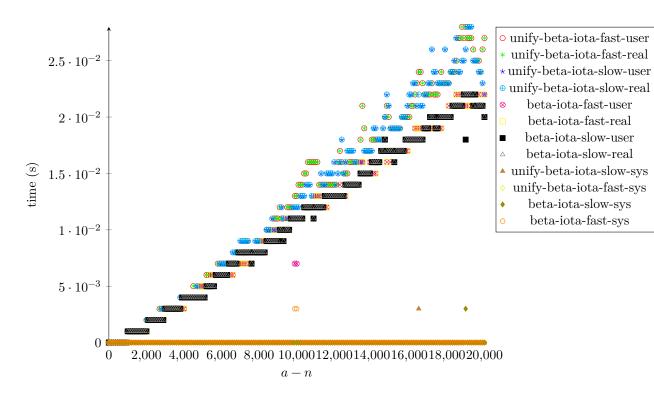


Figure 33: timing-iota-reduction-fact9 param-fact-n $\ 9$

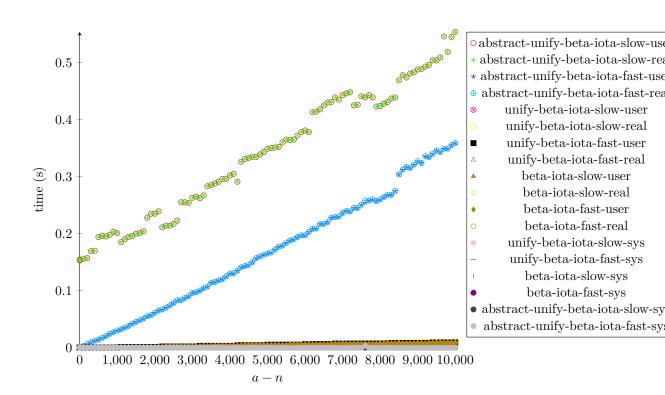


Figure 34: timing-iota-reduction-with-abstract-fact8 param-fact-n $\,\,8\,$

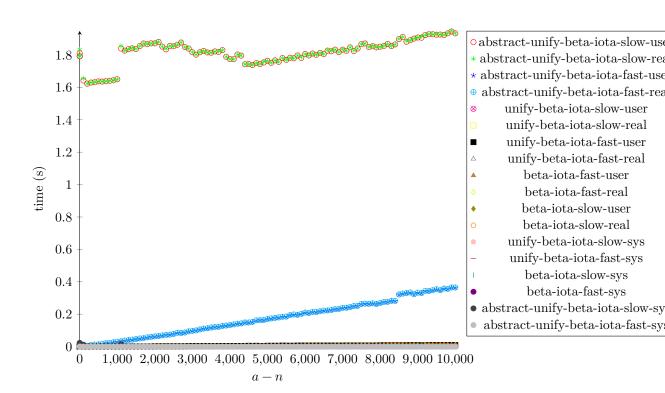


Figure 35: timing-iota-reduction-with-abstract-fact9 param-fact-n $\,\,9$

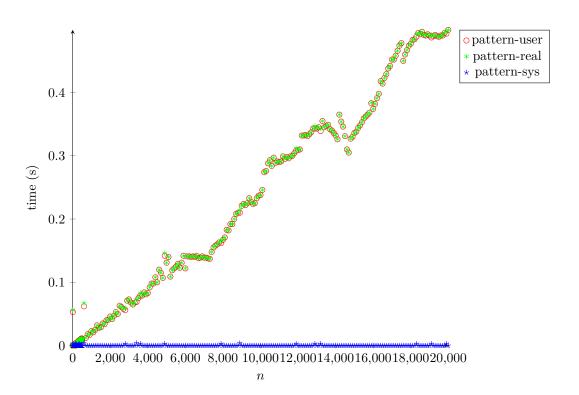


Figure 36: timing-pattern

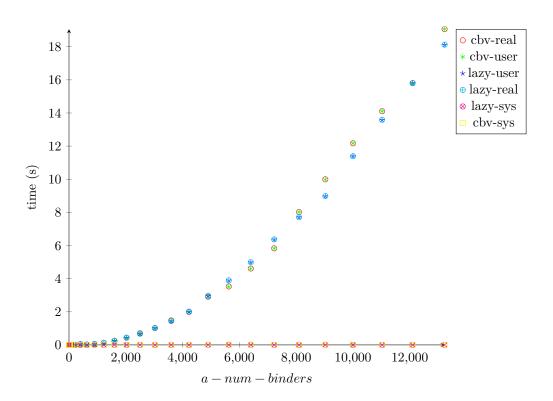


Figure 37: timing-quadratic-cbv-lazy-PHOAS param-n $\,\,0\,\,$

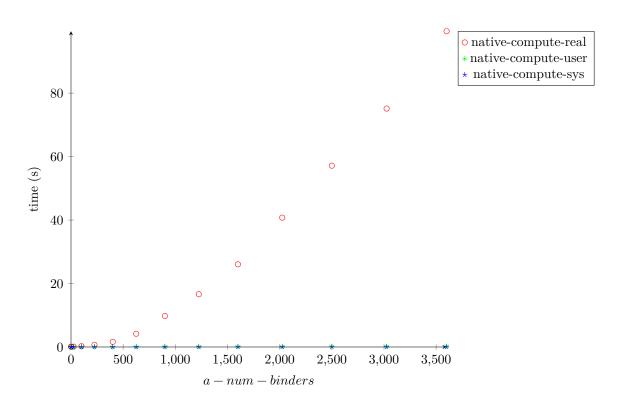


Figure 38: timing-quadratic-native-PHOAS param-n $\,0\,$

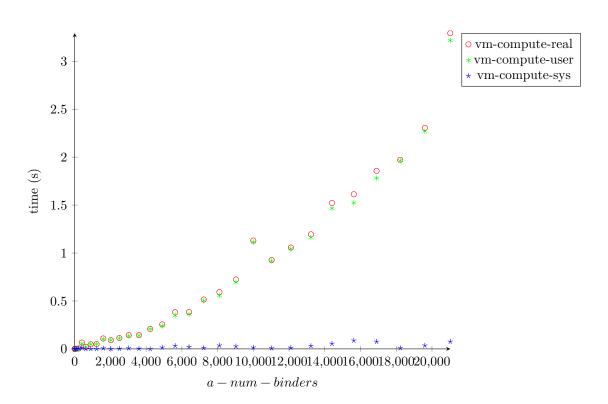


Figure 39: timing-quadratic-vm-PHOAS param-n $\,\,0$