

Figure 1: timing-pattern

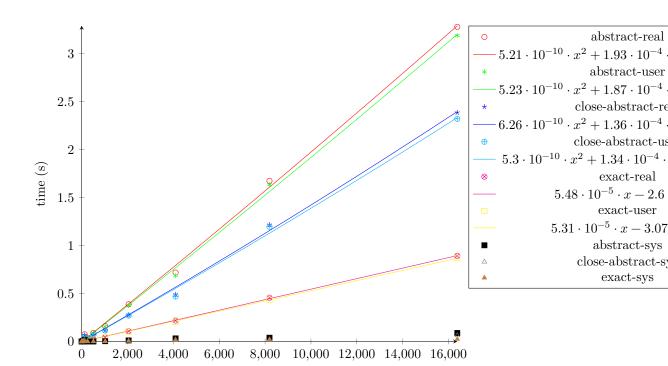


Figure 2: timing-n-polymorphic-universes param-1-n $\,0$

-univ-count

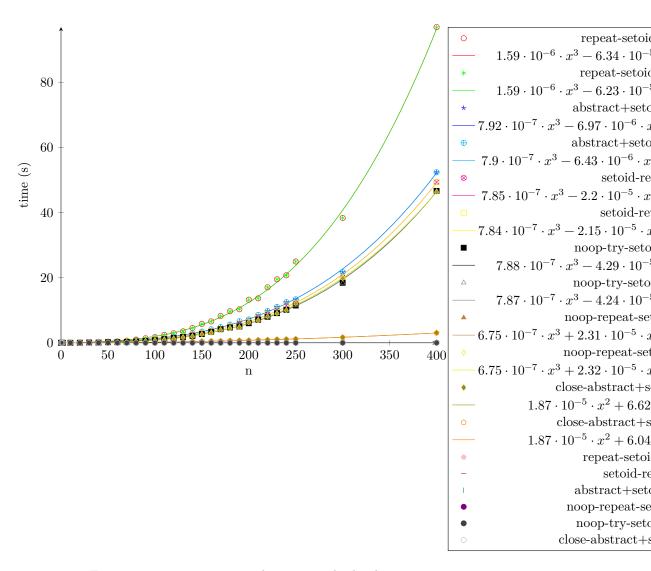
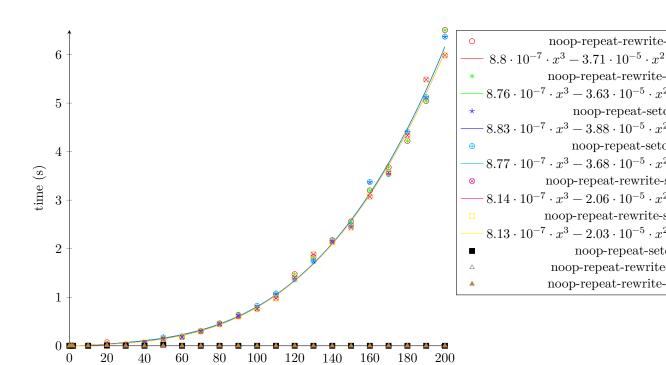


Figure 3: timing-repeat-setoid-rewrite-under-binders



 $Figure\ 4:\ timing-repeat-setoid-rewrite-under-binders-noop$

n

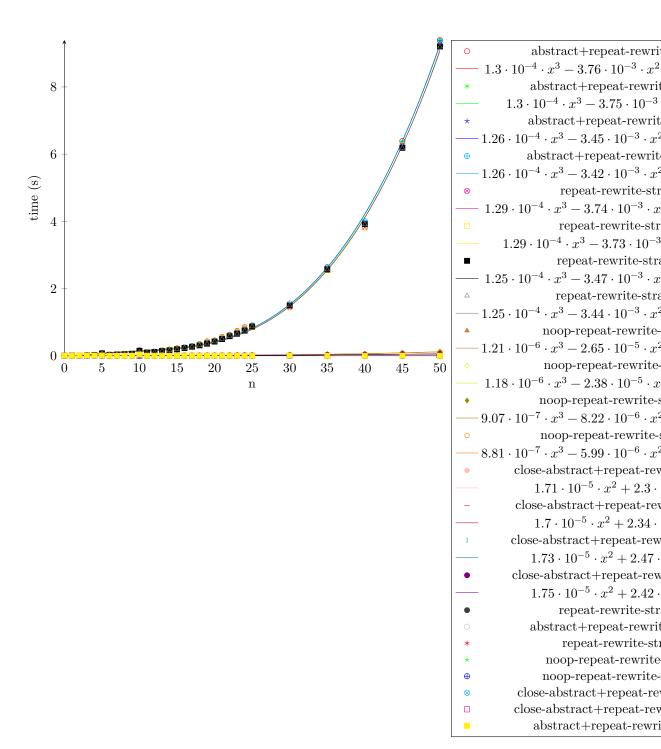
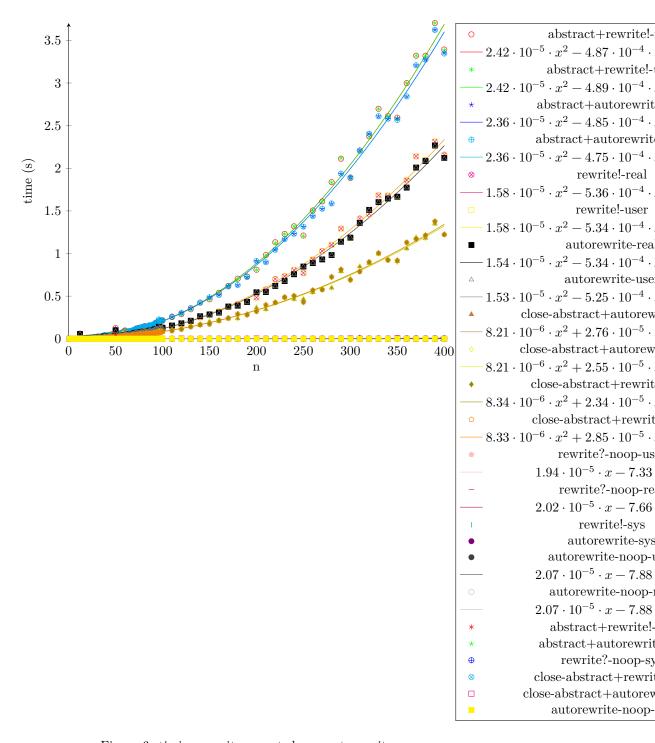


Figure 5: timing-rewrite-strat-under-binders



 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$

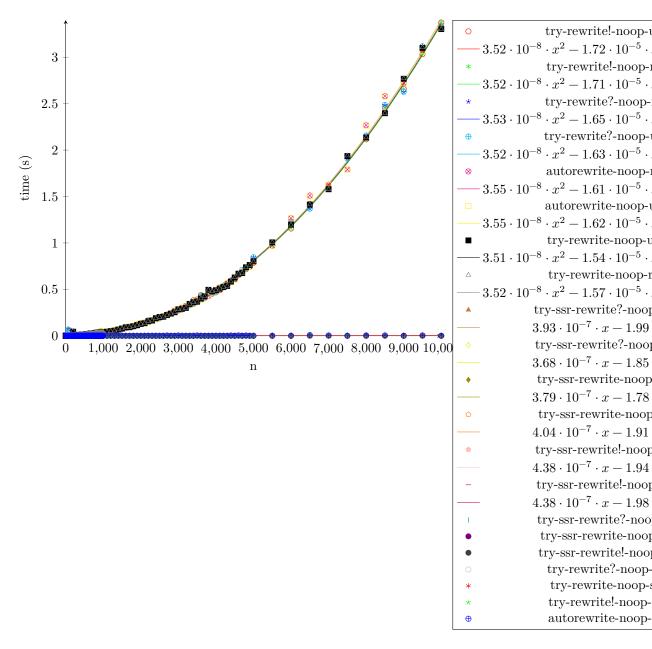


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

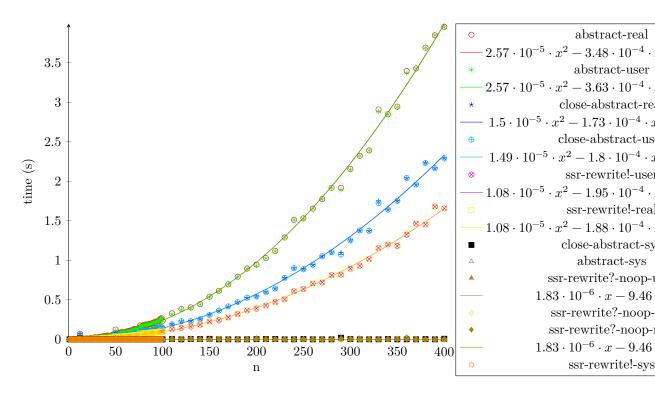


Figure 8: timing-rewrite-repeated-app-ssrrewrite

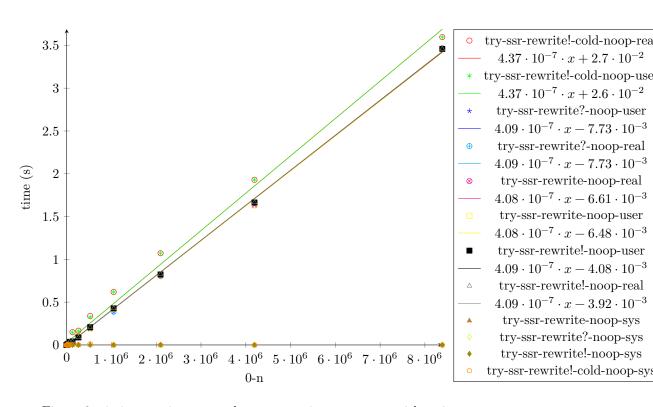


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

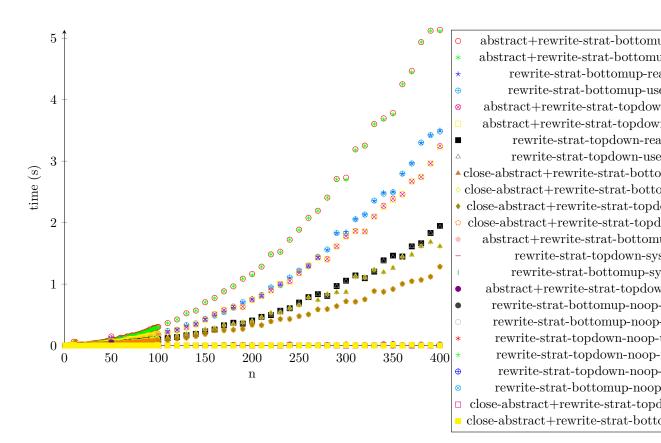


Figure 10: timing-rewrite-repeated-app-rewrite-strat

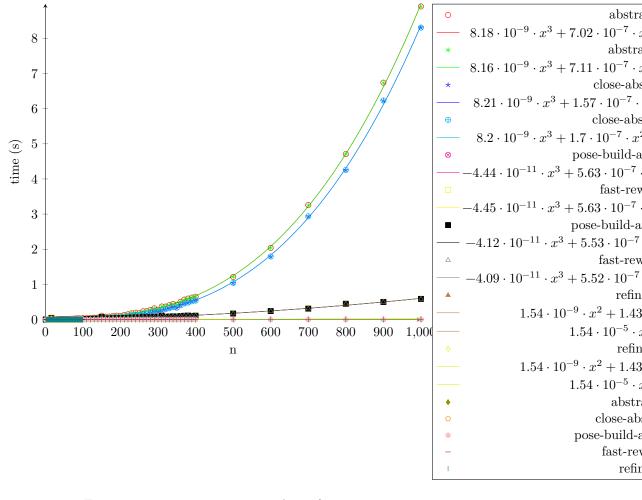
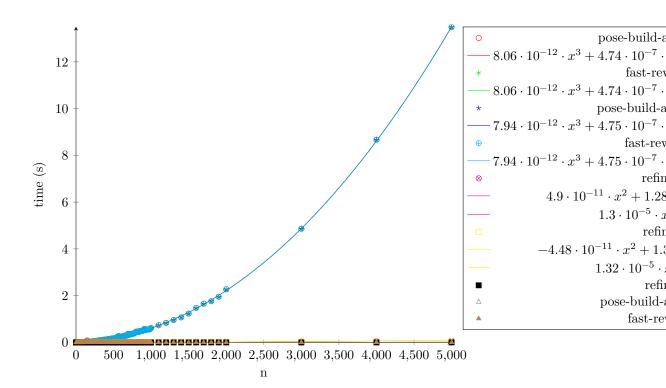
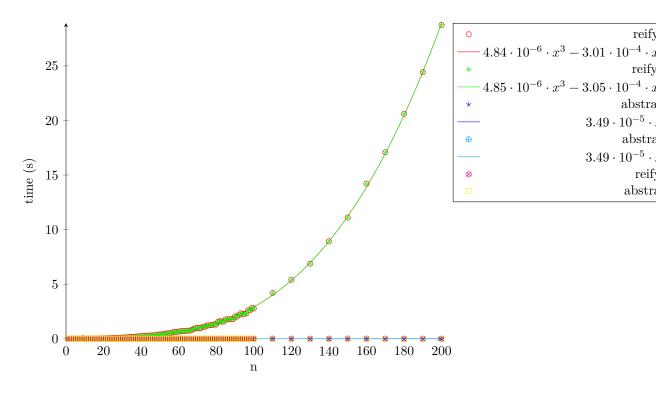


Figure 11: timing-rewrite-repeated-app-fast-rewrite



Figure~12:~timing-rewrite-repeated-app-fast-rewrite-no-abstract



 ${\bf Figure~13:~timing-type class-reification-let-in-HOAS}$

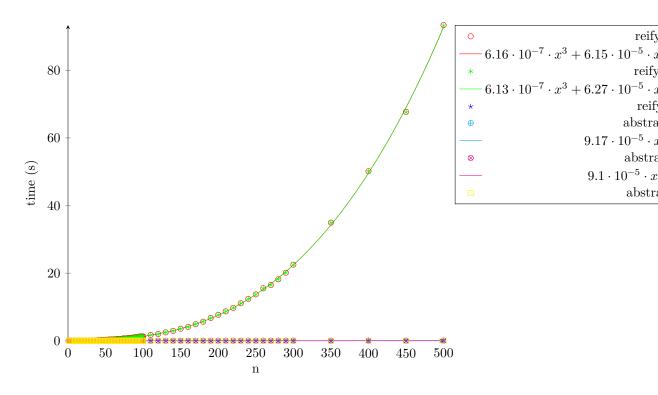
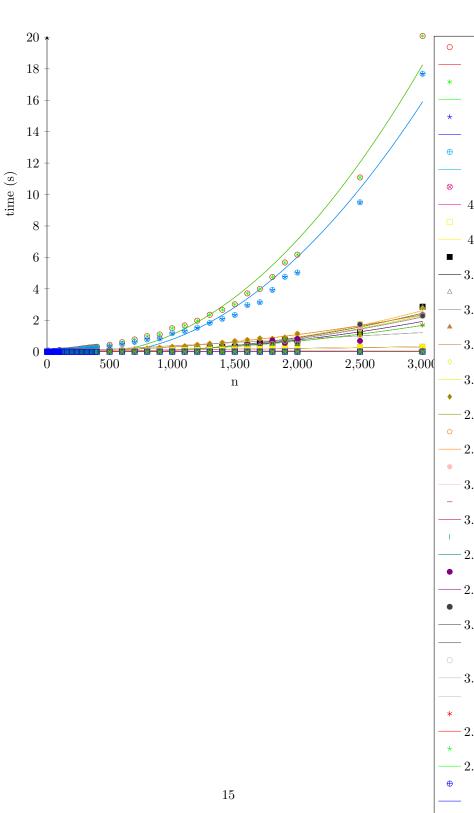


Figure 14: timing-typeclass-reification-let-in-PHOAS



abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

type-pf-cast-real

type-pf-cast-user

type-admit-cast-re

type-admit-cast-us

check-admit-cast-r

check-admit-cast-u

close-abstract-rea

close-abstract-use

check-pf-cast-rea

check-pf-cast-use

check-admit-real

check-admit-user

refine-real

 $4.22 \cdot 10^{-4} \cdot x - 5.13 \cdot$ refine-user

 $4.22 \cdot 10^{-4} \cdot x - 5.14 \cdot$ type-admit-user

type-admit-real

build-eval-thunk-u

 $1.03 \cdot 10^{-4} \cdot x - 9.43 \cdot$ build-eval-thunk-re $1.03 \cdot 10^{-4} \cdot x - 8.17$ build-thunk-user $1.02 \cdot 10^{-4} \cdot x - 1.02 \cdot$ build-thunk-real $1.03 \cdot 10^{-4} \cdot x - 8.86 \cdot$

 $2.56 \cdot 10^{-6} \cdot x^2 - 1.64 \cdot 10^{-6}$

 $2.56 \cdot 10^{-6} \cdot x^2 - 1.64 \cdot 10^{-6}$

 $2.31 \cdot 10^{-6} \cdot x^2 - 1.7 \cdot 10^{-3}$