

Figure 1: timing-pattern

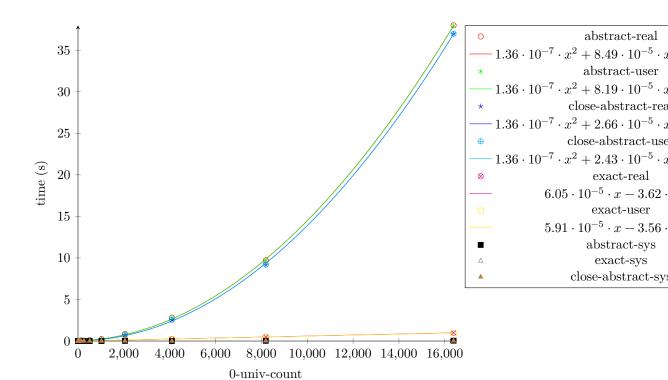


Figure 2: timing-n-polymorphic-universes param-1-n 0

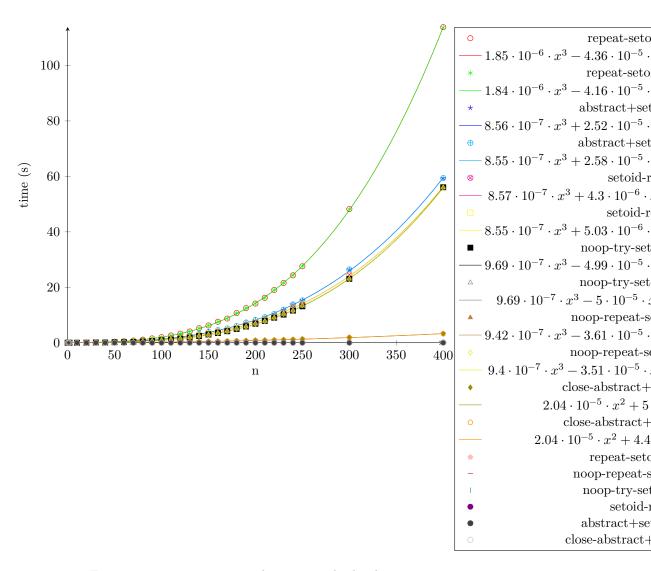
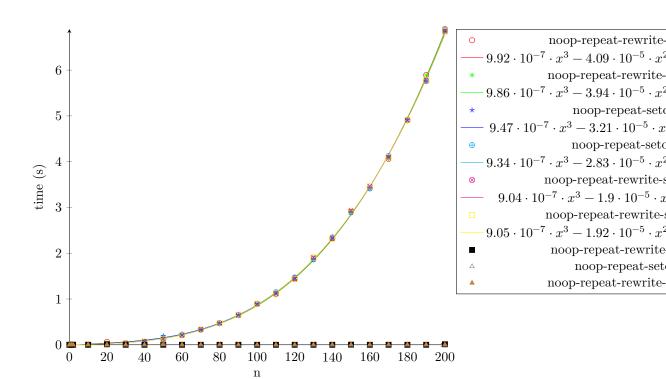


Figure 3: timing-repeat-setoid-rewrite-under-binders



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

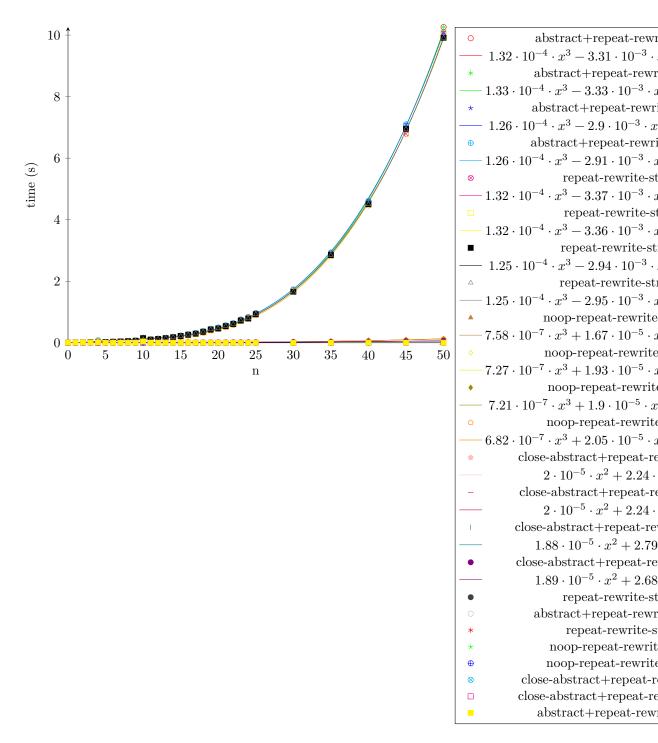
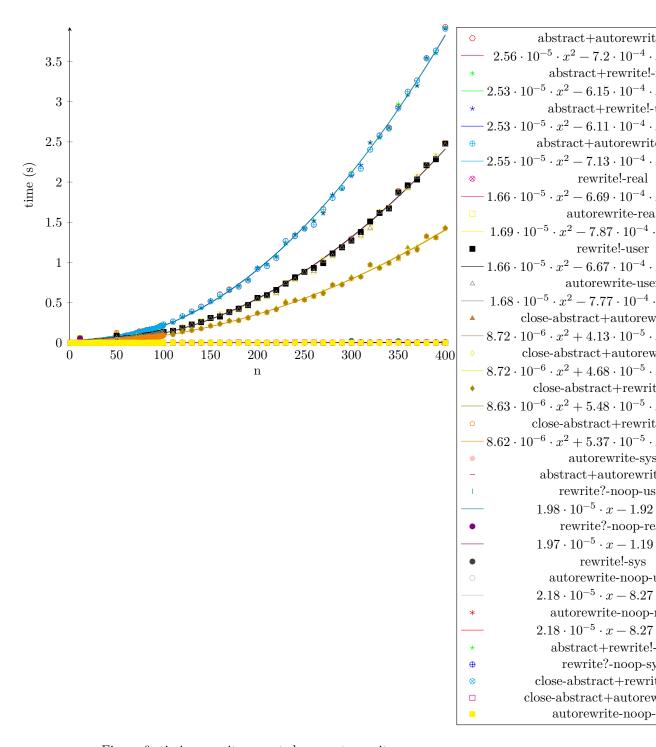


Figure 5: timing-rewrite-strat-under-binders



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

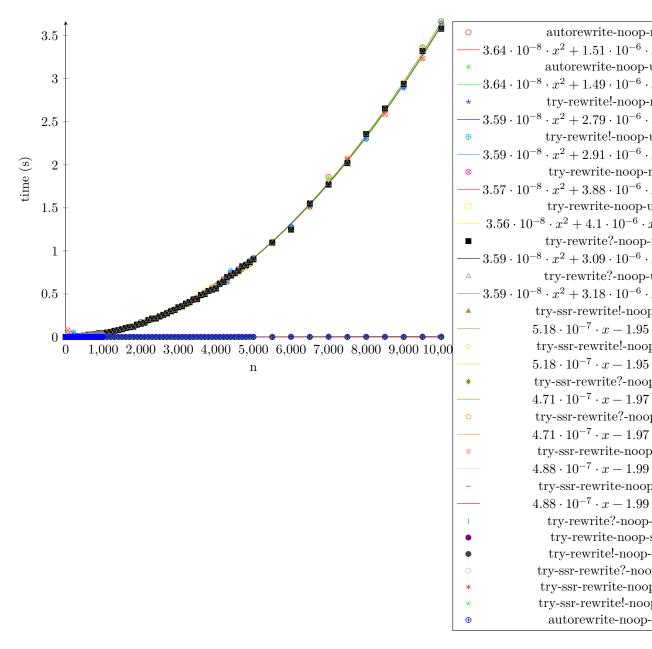
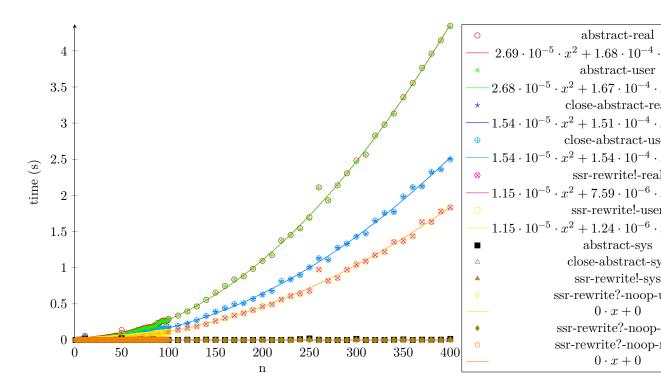


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



 $Figure~8:~timing\mbox{-rewrite-repeated-app-ssrrewrite}$ 

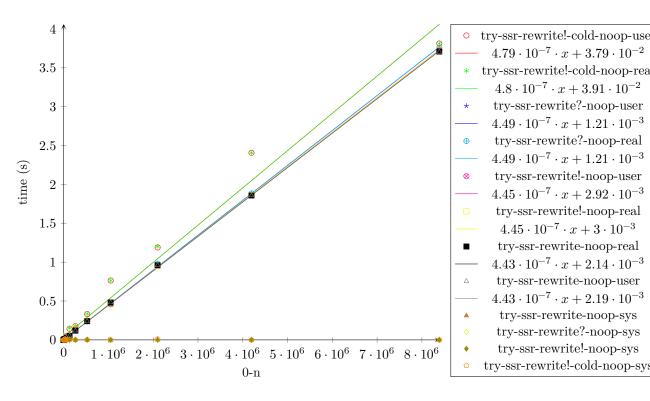


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

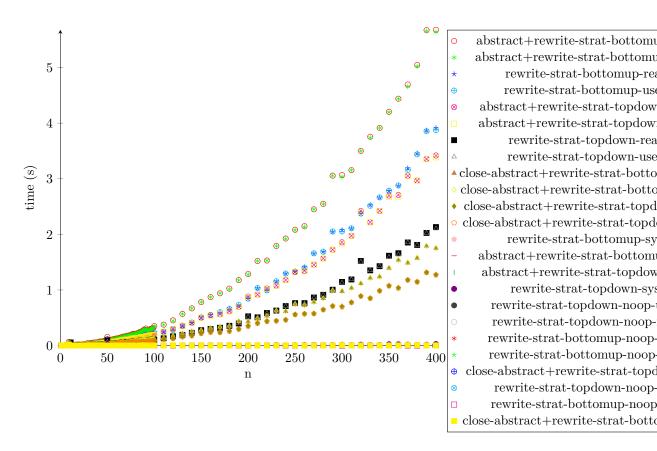


Figure 10: timing-rewrite-repeated-app-rewrite-strat

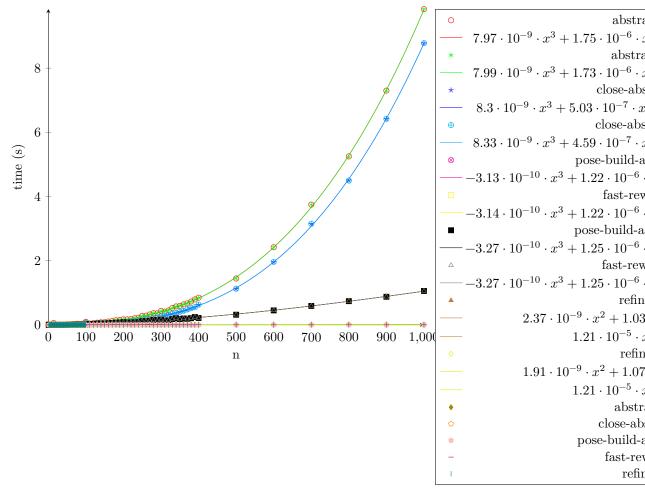
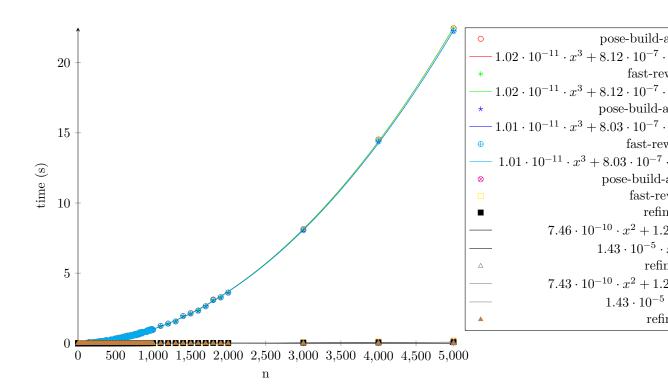


Figure 11: timing-rewrite-repeated-app-fast-rewrite



 ${\bf Figure~12:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}fast\text{-}rewrite\text{-}no\text{-}abstract}}$ 

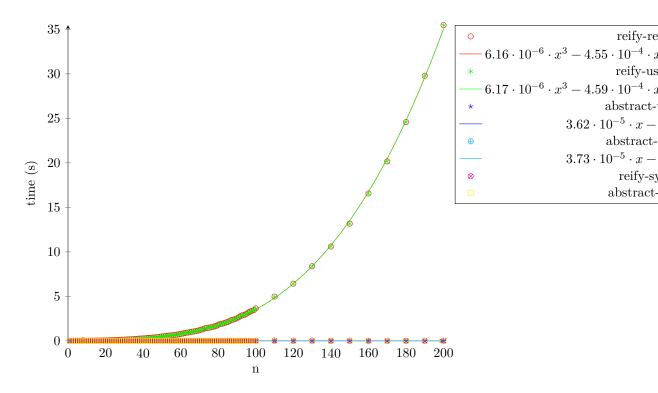


Figure 13: timing-typeclass-reification-let-in-HOAS

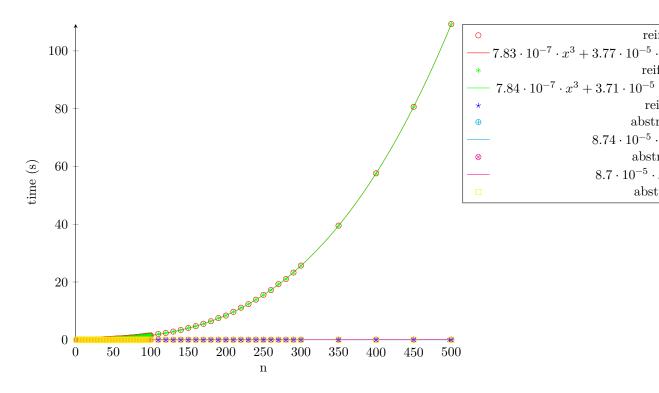
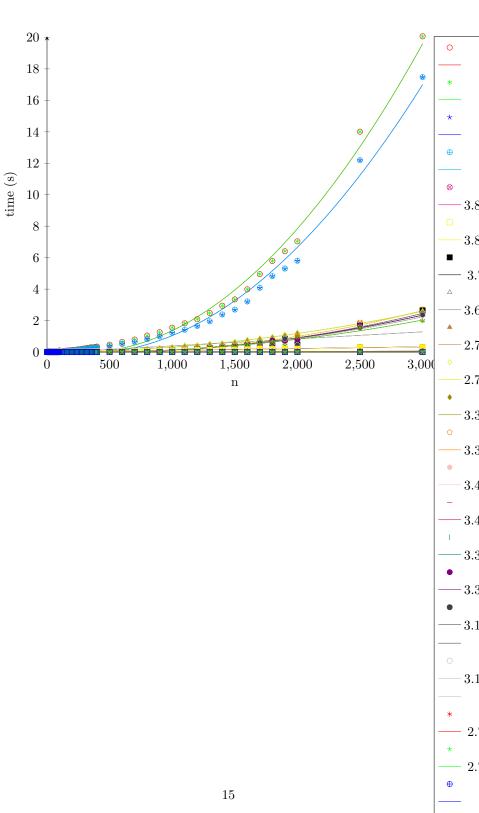


Figure 14: timing-typeclass-reification-let-in-PHOAS



abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

check-pf-cast-use

check-pf-cast-rea

close-abstract-rea

close-abstract-use

type-pf-cast-user

type-pf-cast-real

type-admit-user

type-admit-real

refine-user

refine-real

check-admit-real

check-admit-user

build-thunk-user  $1.11 \cdot 10^{-4} \cdot x - 5.74$ build-thunk-real  $1.11 \cdot 10^{-4} \cdot x - 3.65$ 

 $2.63 \cdot 10^{-6} \cdot x^2 - 1.41 \cdot 10^{-6}$