

Figure 1: timing-pattern

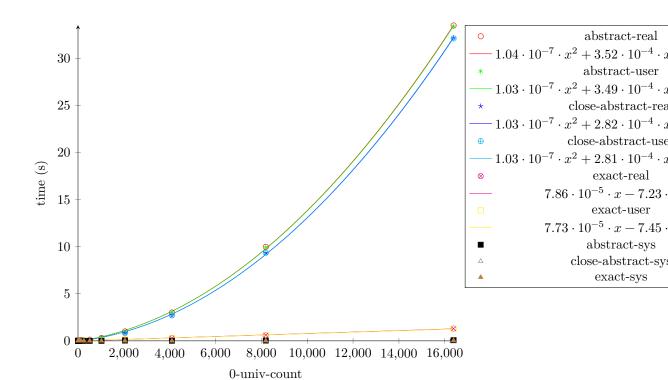


Figure 2: timing-n-polymorphic-universes param-1-n 0

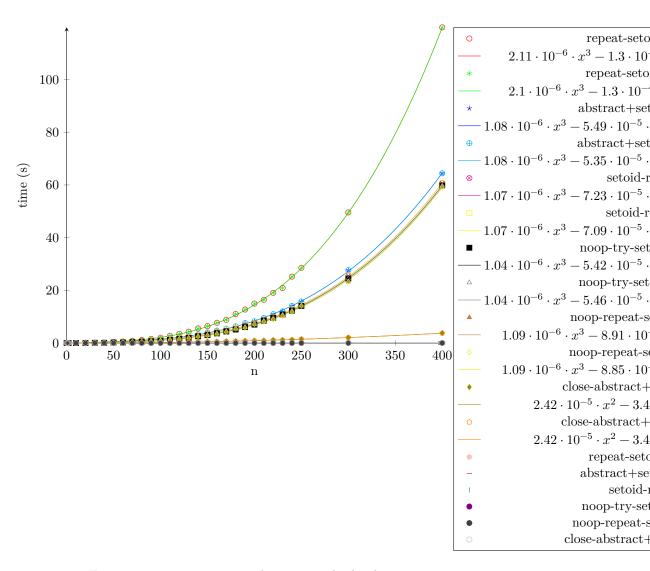


Figure 3: timing-repeat-setoid-rewrite-under-binders

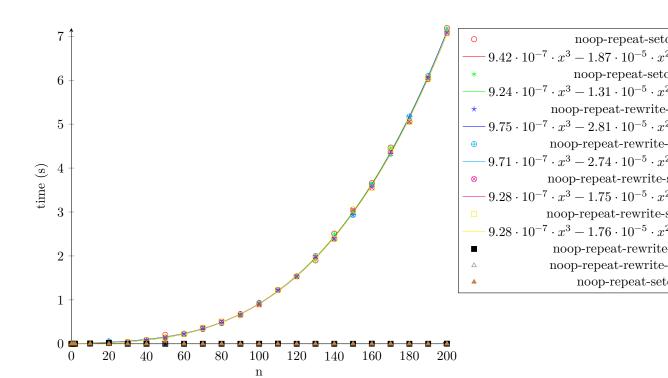


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

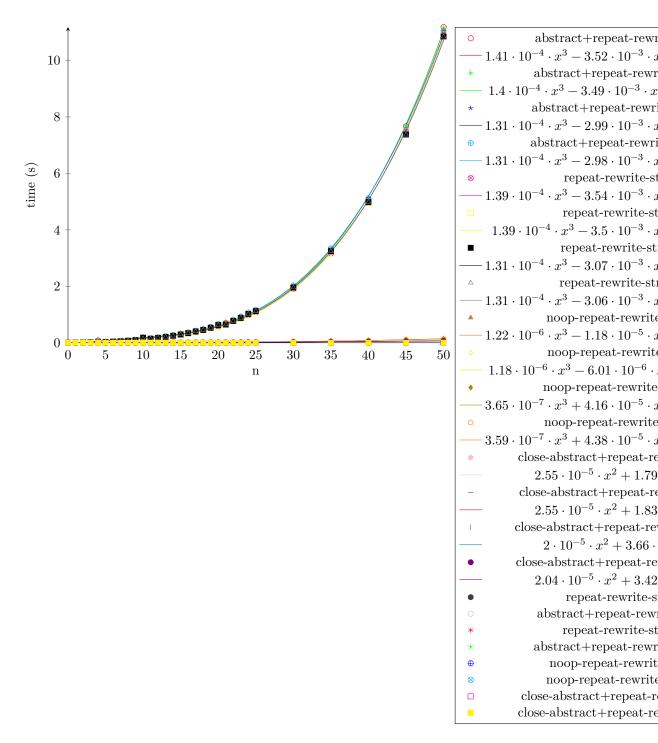


Figure 5: timing-rewrite-strat-under-binders

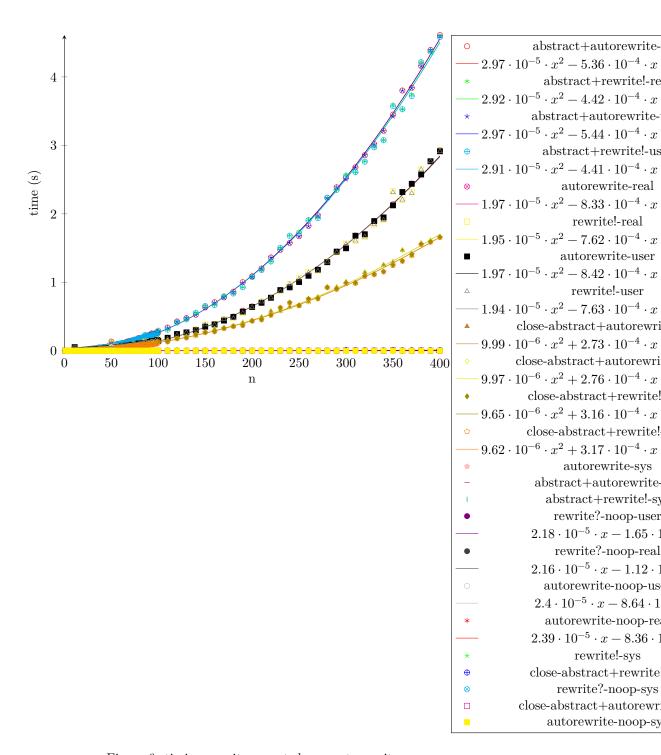


Figure 6: timing-rewrite-repeated-app-autorewrite

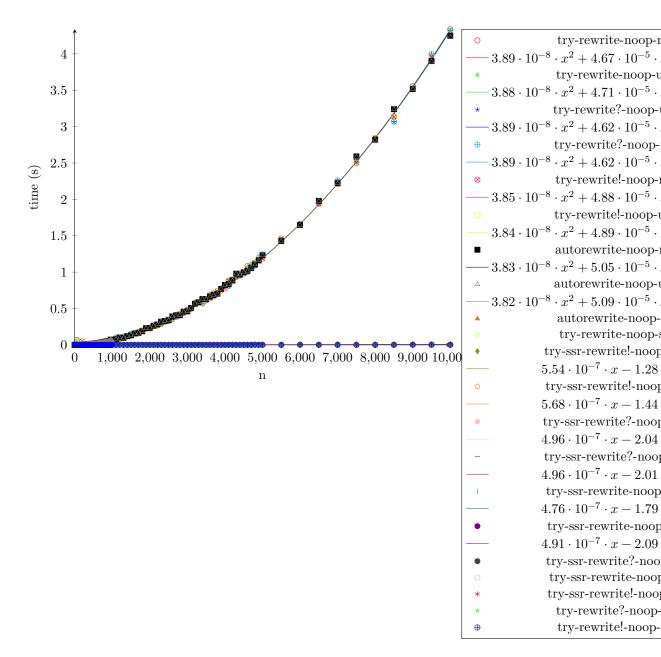
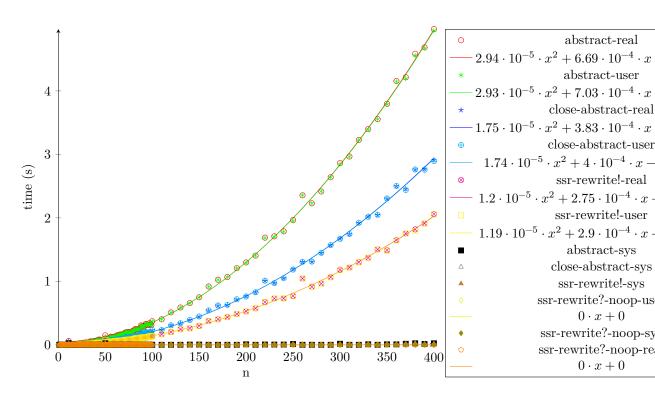


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

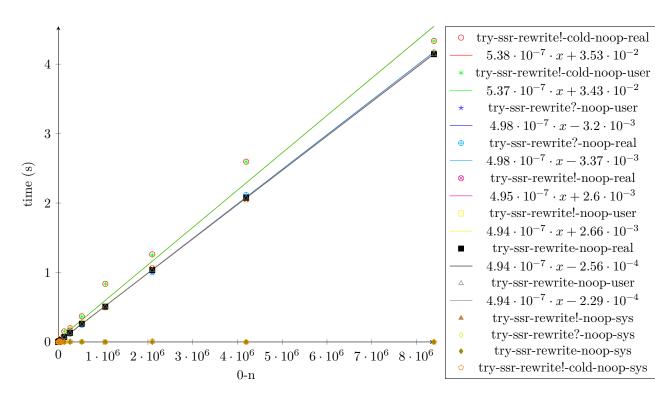


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn  $\ 1$ 

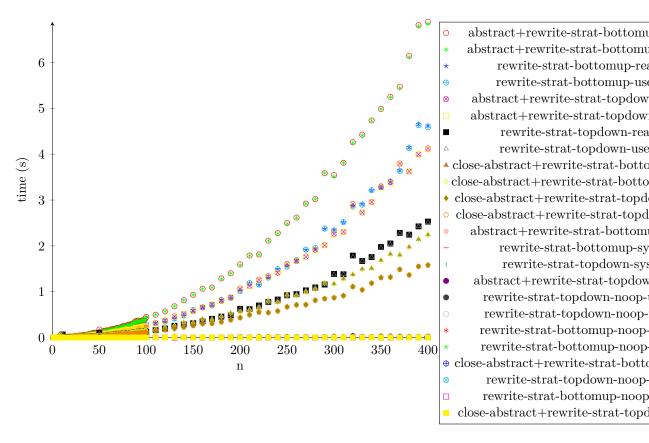
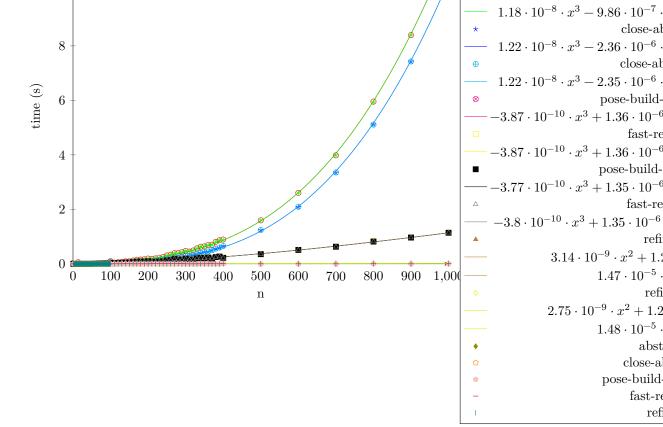


Figure 10: timing-rewrite-repeated-app-rewrite-strat



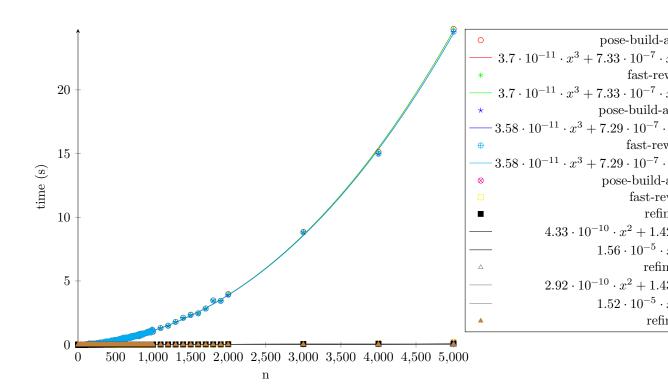
abst

abst

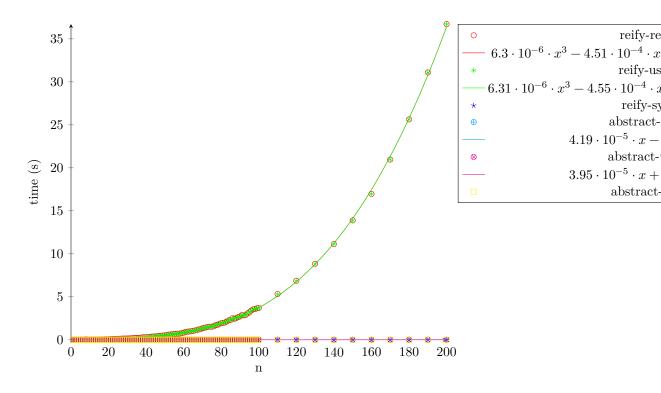
 $1.18 \cdot 10^{-8} \cdot x^3 - 9.68 \cdot 10^{-7} \cdot$ 

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

10



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



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

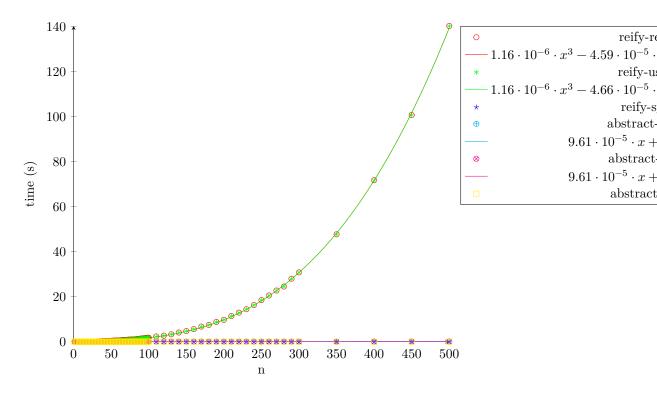
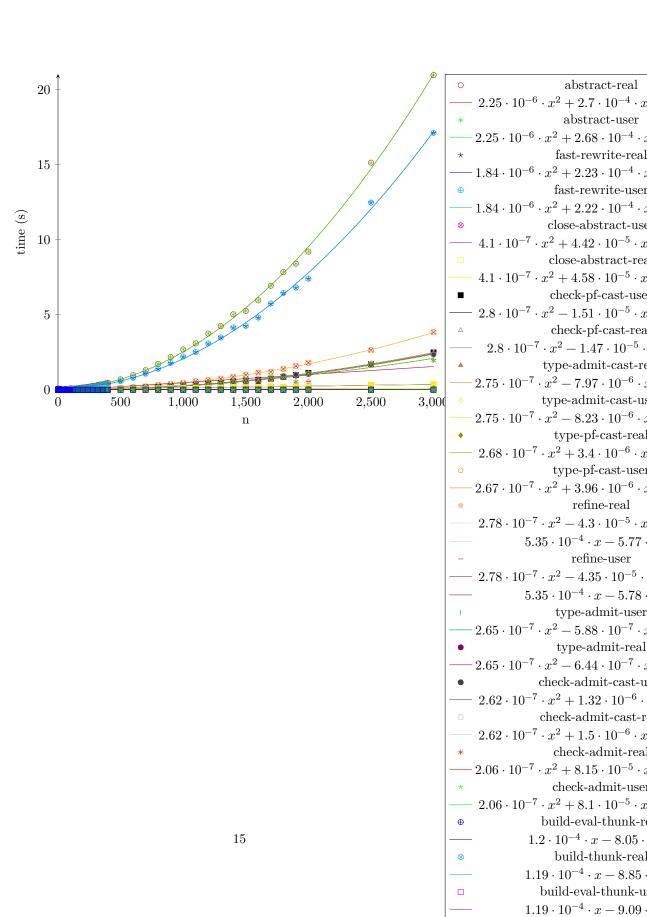


Figure 14: timing-typeclass-reification-let-in-PHOAS



abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-use

close-abstract-rea

check-pf-cast-use

check-pf-cast-rea

type-admit-cast-re

type-admit-cast-us

type-pf-cast-real

type-pf-cast-user

refine-real

 $5.35 \cdot 10^{-4} \cdot x - 5.77 \cdot$ refine-user

 $5.35 \cdot 10^{-4} \cdot x - 5.78 \cdot$ type-admit-user

type-admit-real

check-admit-cast-u

check-admit-cast-r

check-admit-real

check-admit-user

build-eval-thunk-re

 $1.2 \cdot 10^{-4} \cdot x - 8.05 \cdot$ build-thunk-real  $1.19 \cdot 10^{-4} \cdot x - 8.85 \cdot$ build-eval-thunk-u  $1.19 \cdot 10^{-4} \cdot x - 9.09 \cdot$ build-thunk-user  $1.18 \cdot 10^{-4} \cdot x - 9.94 \cdot$ aboalt I ugan