

Figure 1: timing-pattern

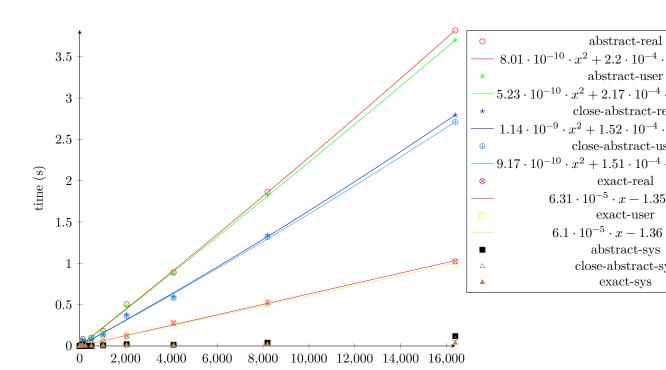


Figure 2: timing-n-polymorphic-universes param-1-n 0

-univ-count

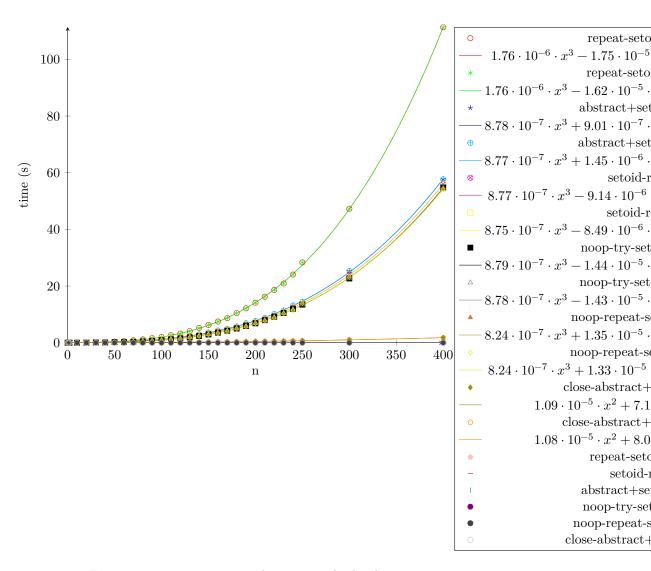


Figure 3: timing-repeat-setoid-rewrite-under-binders

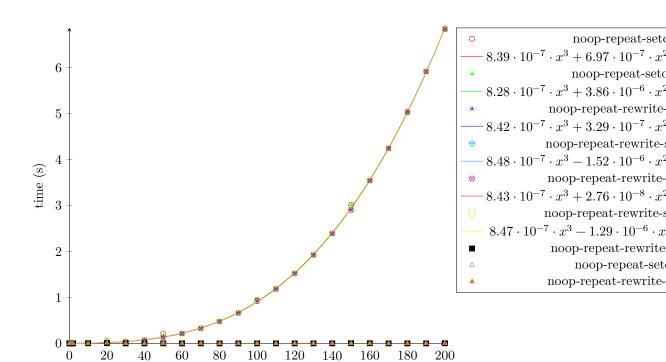


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

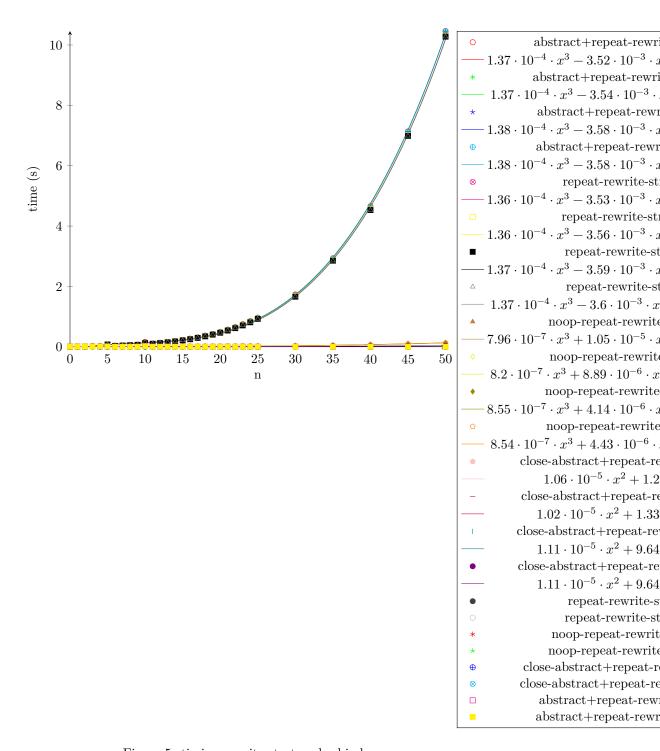
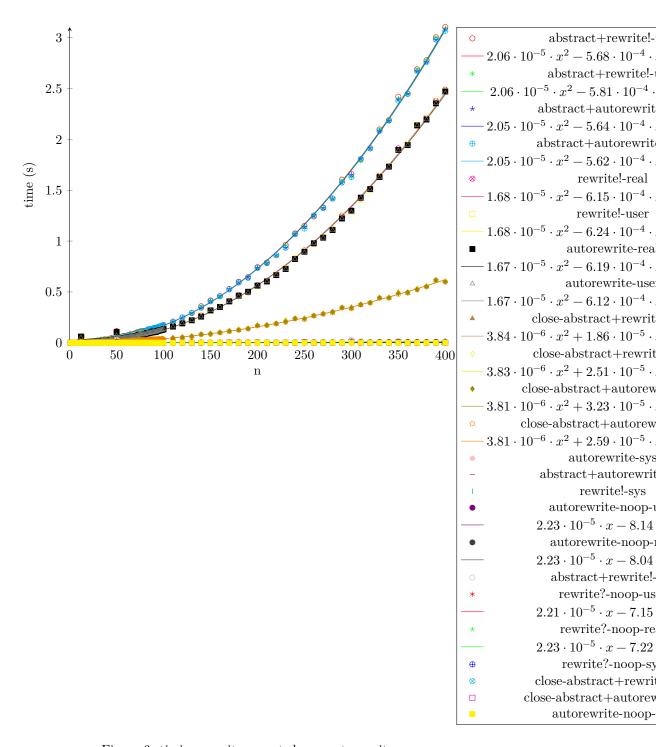


Figure 5: timing-rewrite-strat-under-binders



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

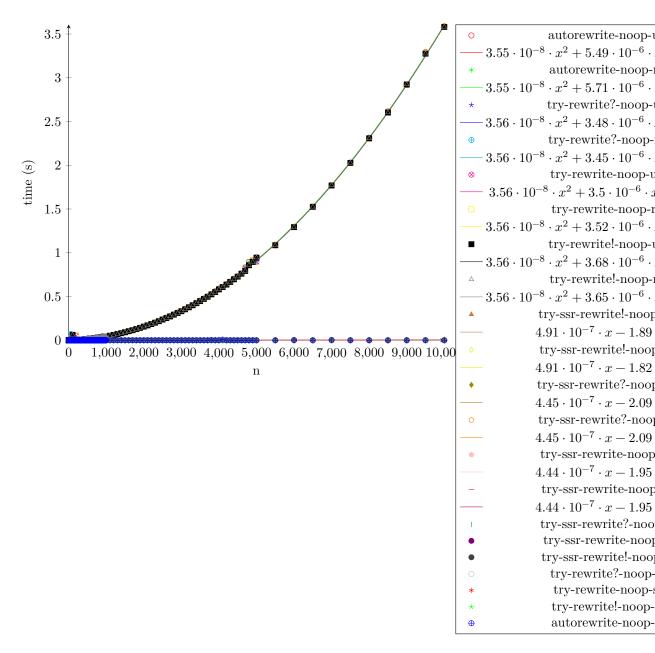


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

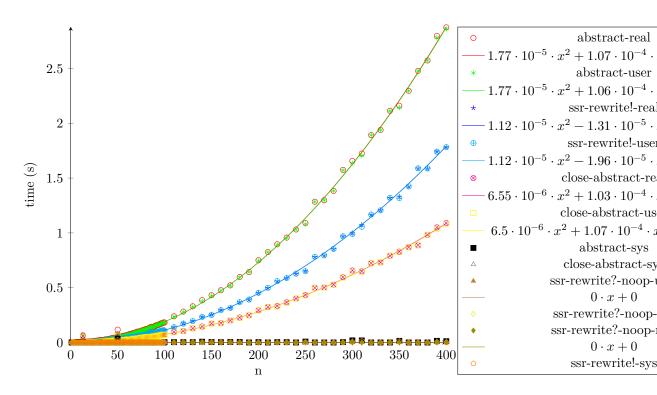


Figure 8: timing-rewrite-repeated-app-ssrrewrite

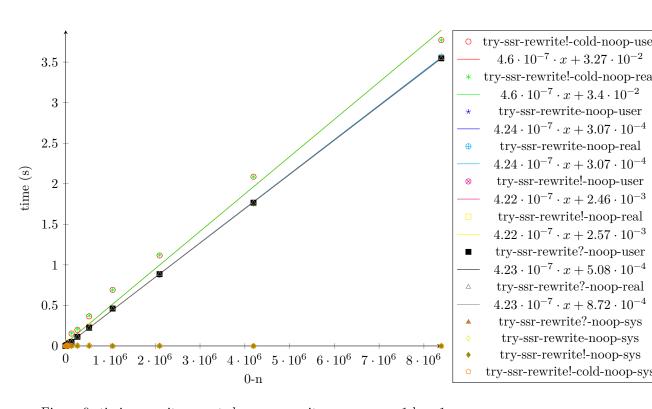


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

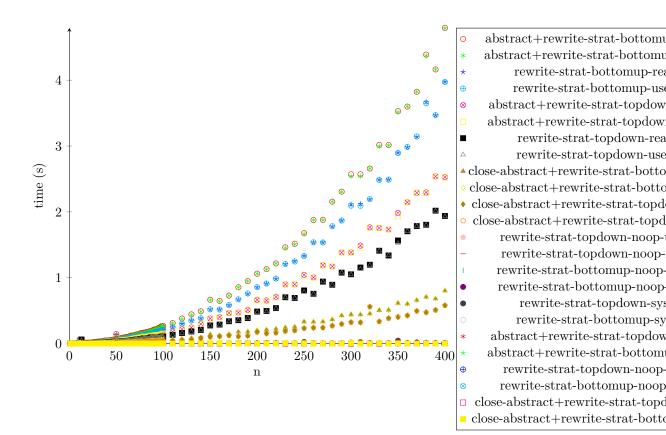


Figure 10: timing-rewrite-repeated-app-rewrite-strat

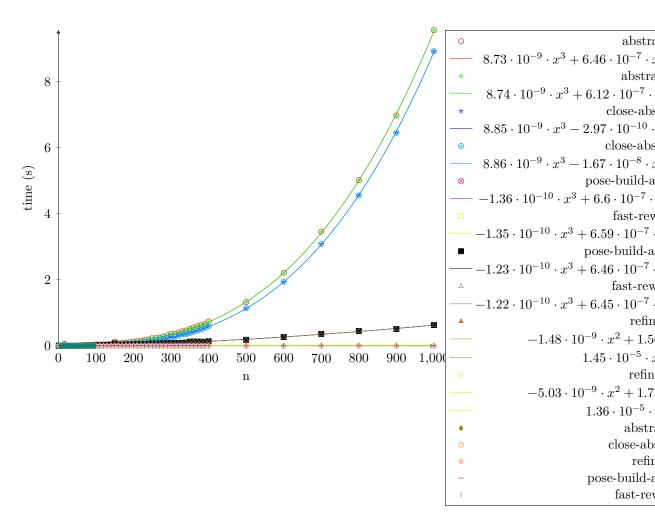
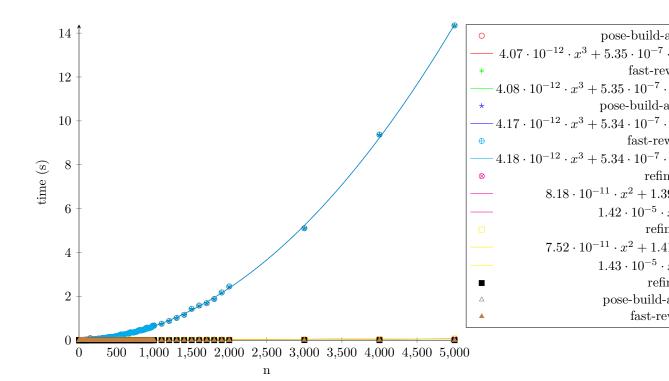
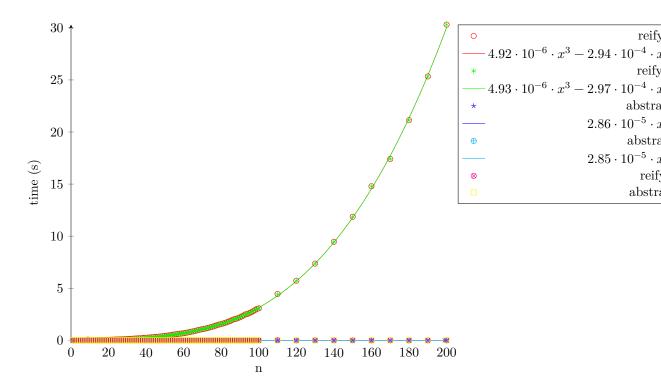


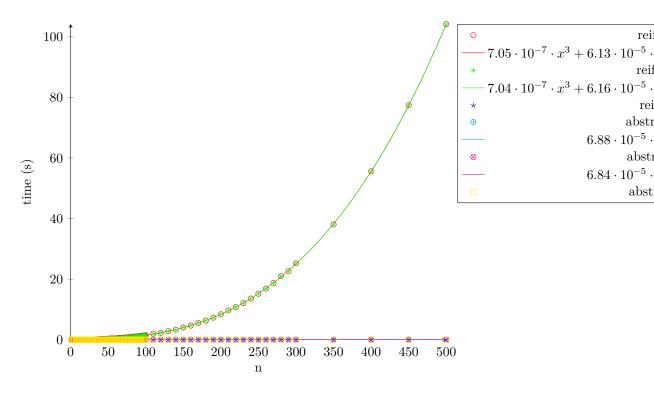
Figure 11: timing-rewrite-repeated-app-fast-rewrite



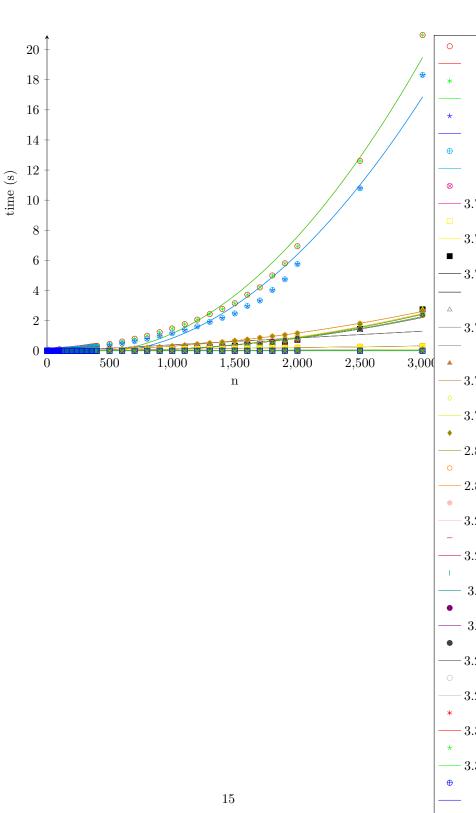
 ${\bf Figure~12:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}fast\text{-}rewrite\text{-}no\text{-}abstract}}$



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



 ${\bf Figure~14:~timing-type class-reification-let-in-PHOAS}$



abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

check-pf-cast-use

check-pf-cast-rea

 $4.52 \cdot 10^{-4} \cdot x - 5.55 \cdot$ refine-user

 $4.52 \cdot 10^{-4} \cdot x - 5.55 \cdot$

check-admit-user

check-admit-real

close-abstract-use

close-abstract-rea

type-admit-cast-us

type-admit-cast-re

type-pf-cast-user

type-pf-cast-real

check-admit-cast-u

check-admit-cast-r

type-admit-user

type-admit-real

build-eval-thunk-u

 $1.05 \cdot 10^{-4} \cdot x - 8.66 \cdot$ build-eval-thunk-re $1.06 \cdot 10^{-4} \cdot x - 7.4 \cdot$

 $1.05 \cdot 10^{-4} \cdot x - 7.46 \cdot$ shool. I

refine-real

 $2.73 \cdot 10^{-6} \cdot x^2 - 1.76 \cdot 10^{-6}$

 $2.73 \cdot 10^{-6} \cdot x^2 - 1.77 \cdot 10^{-6}$

 $2.45 \cdot 10^{-6} \cdot x^2 - 1.78 \cdot 10^{-6}$

 $2.45 \cdot 10^{-6} \cdot x^2 - 1.79 \cdot 10^{-6}$