

Figure 1: timing-pattern

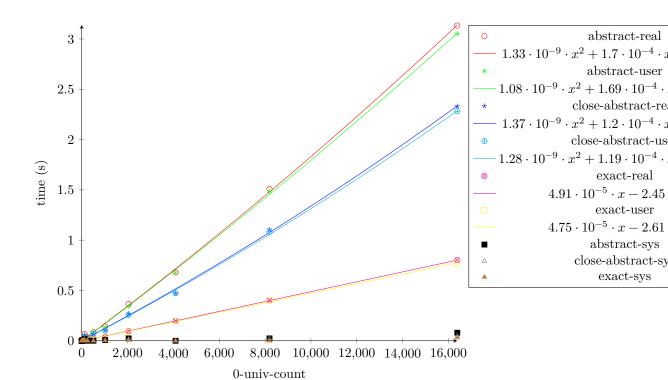


Figure 2: timing-n-polymorphic-universes param-1-n 0

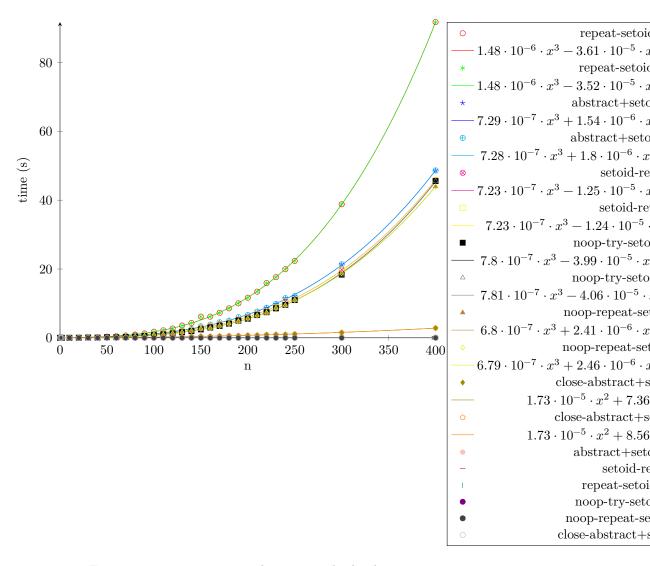


Figure 3: timing-repeat-setoid-rewrite-under-binders

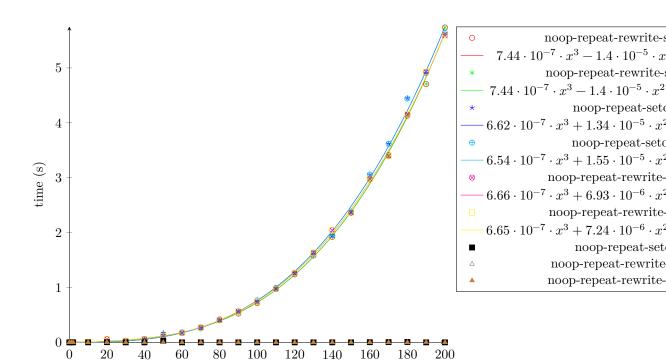


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

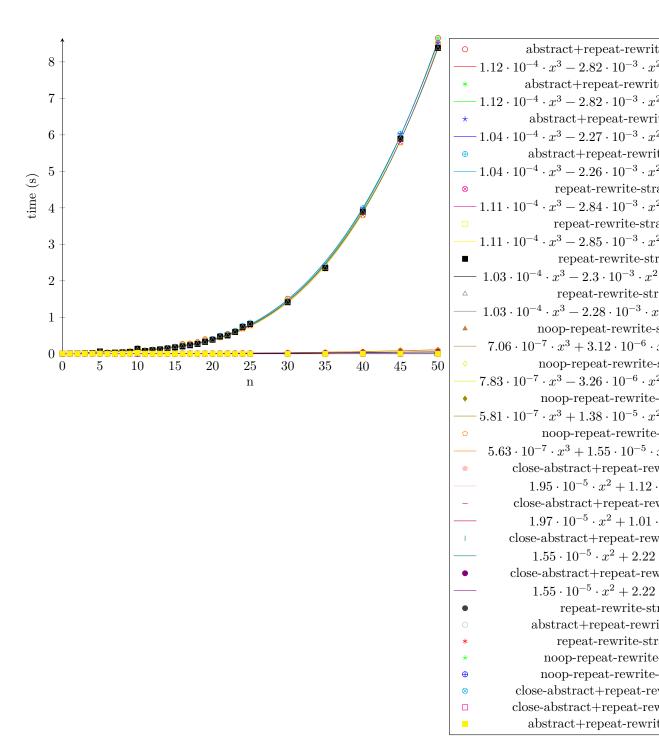


Figure 5: timing-rewrite-strat-under-binders

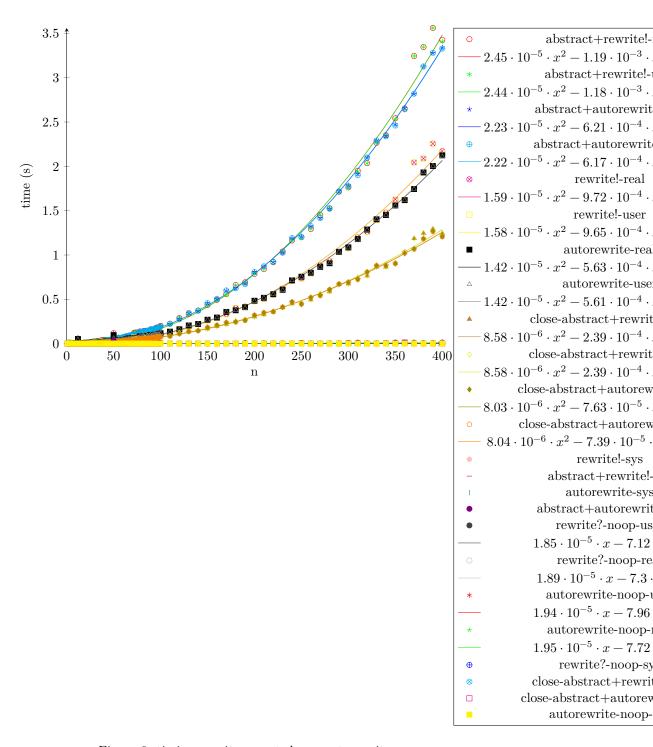


Figure 6: timing-rewrite-repeated-app-autorewrite

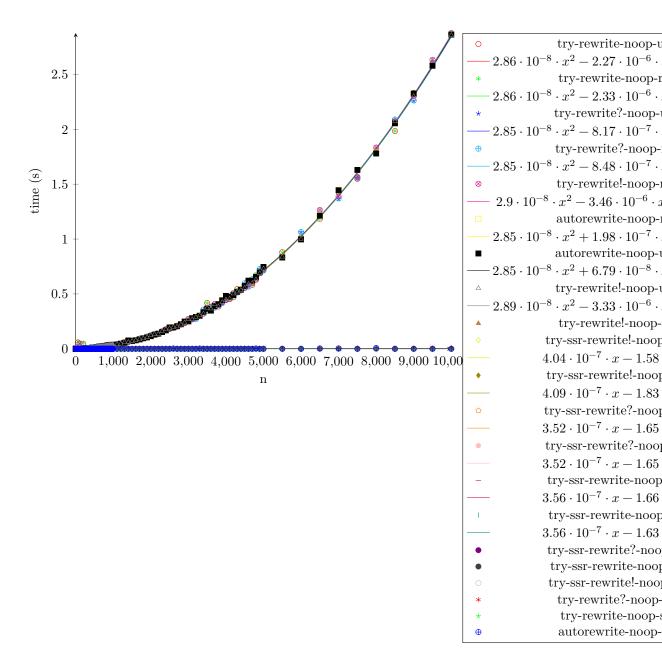


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

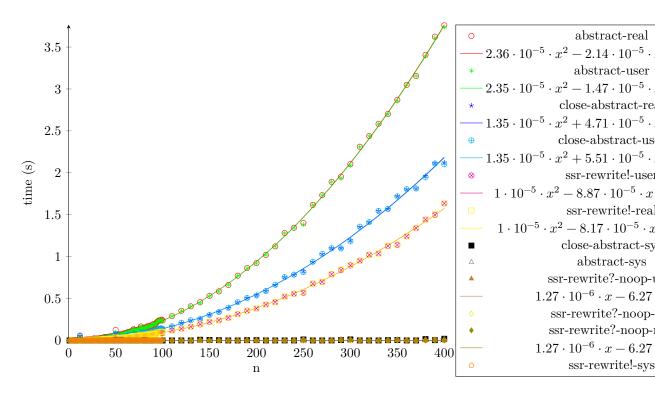


Figure 8: timing-rewrite-repeated-app-ssrrewrite

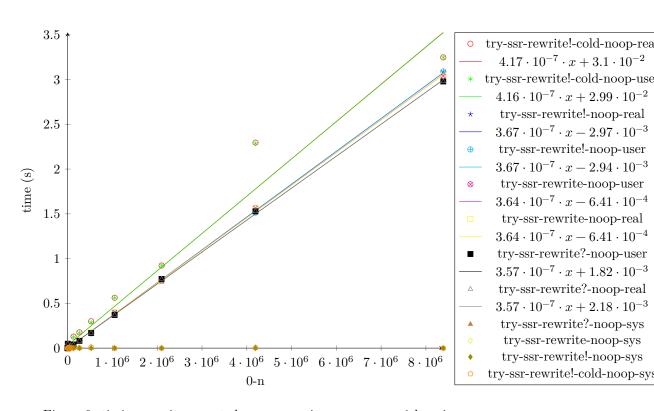


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

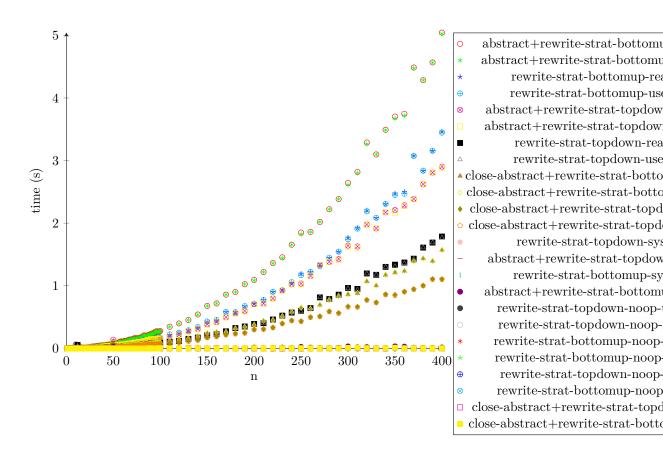


Figure 10: timing-rewrite-repeated-app-rewrite-strat

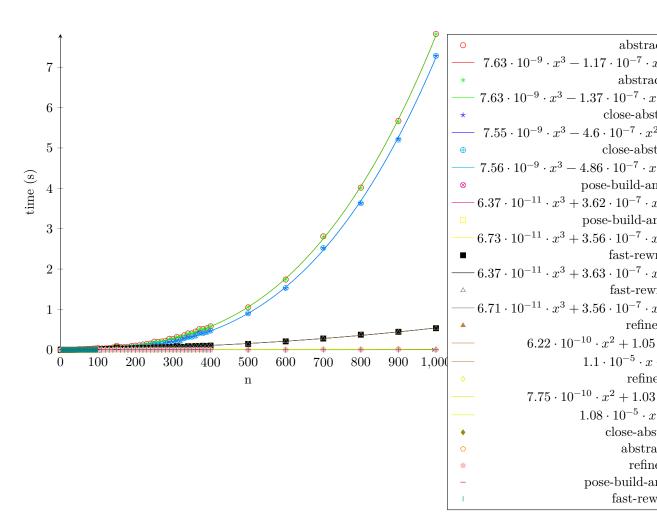
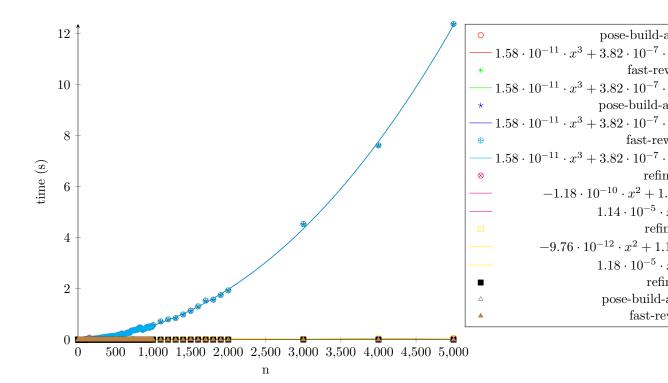
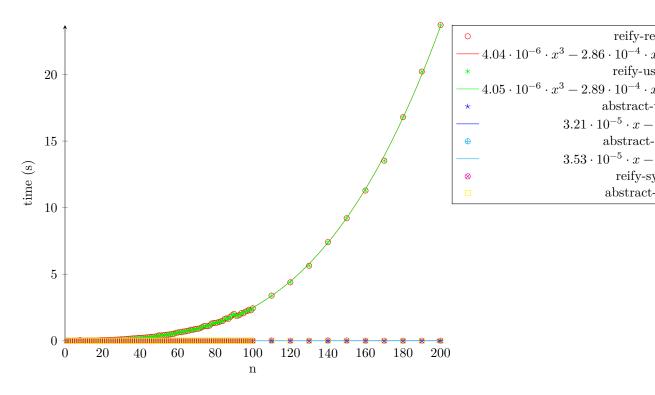


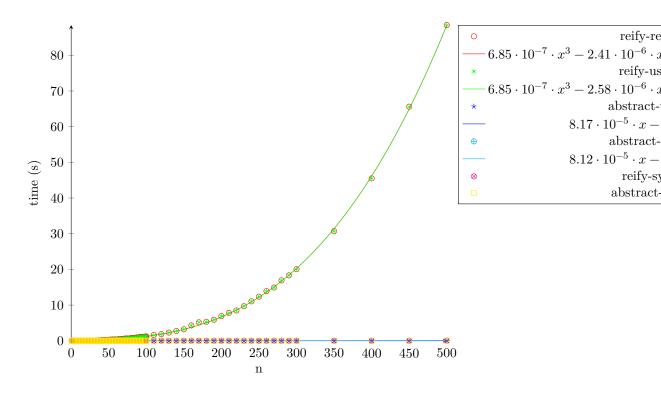
Figure 11: timing-rewrite-repeated-app-fast-rewrite



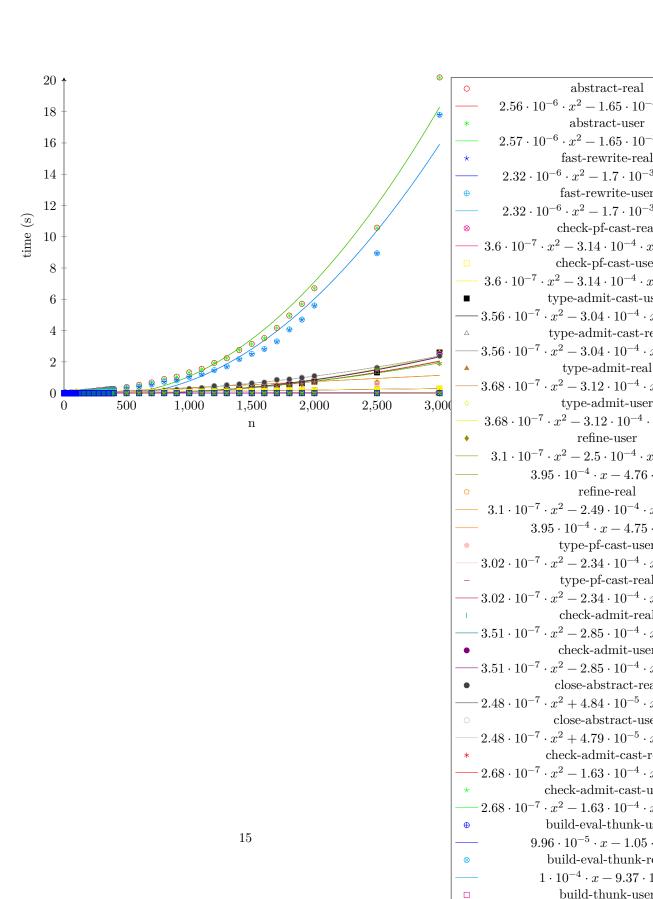
 ${\bf Figure~12:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}fast\text{-}rewrite\text{-}no\text{-}abstract}}$



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



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



 $abstract\text{-}\mathrm{real}$

abstract-user

fast-rewrite-real

fast-rewrite-user

check-pf-cast-rea

check-pf-cast-use

type-admit-cast-us

type-admit-cast-re

type-admit-real

type-admit-user

refine-user

 $3.95 \cdot 10^{-4} \cdot x - 4.76 \cdot$ refine-real

 $3.95 \cdot 10^{-4} \cdot x - 4.75 \cdot$ type-pf-cast-user

type-pf-cast-real

check-admit-real

check-admit-user

close-abstract-rea

close-abstract-use

check-admit-cast-r

check-admit-cast-u

build-eval-thunk-u

 $9.96 \cdot 10^{-5} \cdot x - 1.05$ build-eval-thunk-re $1 \cdot 10^{-4} \cdot x - 9.37 \cdot 1$ build-thunk-user $9.88 \cdot 10^{-5} \cdot x - 1.08 \cdot$ build-thunk-real $9.94 \cdot 10^{-5} \cdot x - 9.82 \cdot$