

Figure 1: timing-pattern

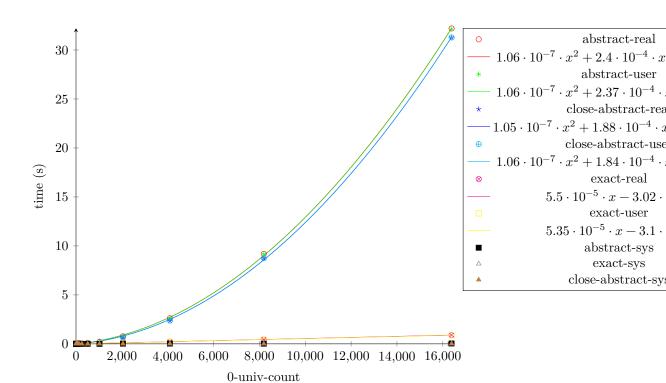


Figure 2: timing-n-polymorphic-universes param-1-n 0

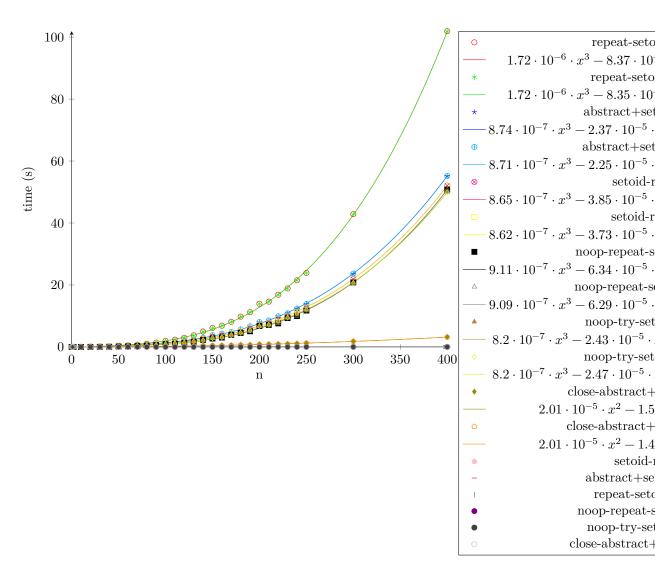
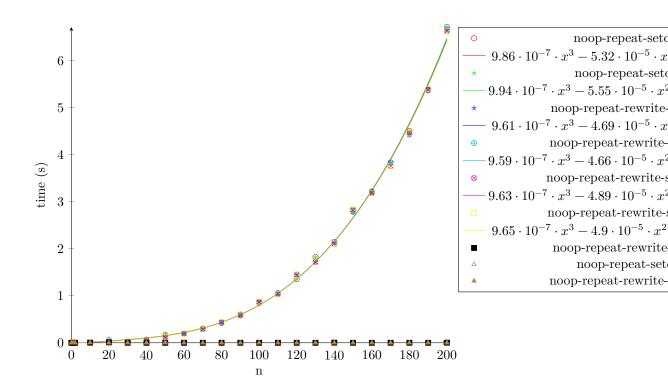


Figure 3: timing-repeat-setoid-rewrite-under-binders



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

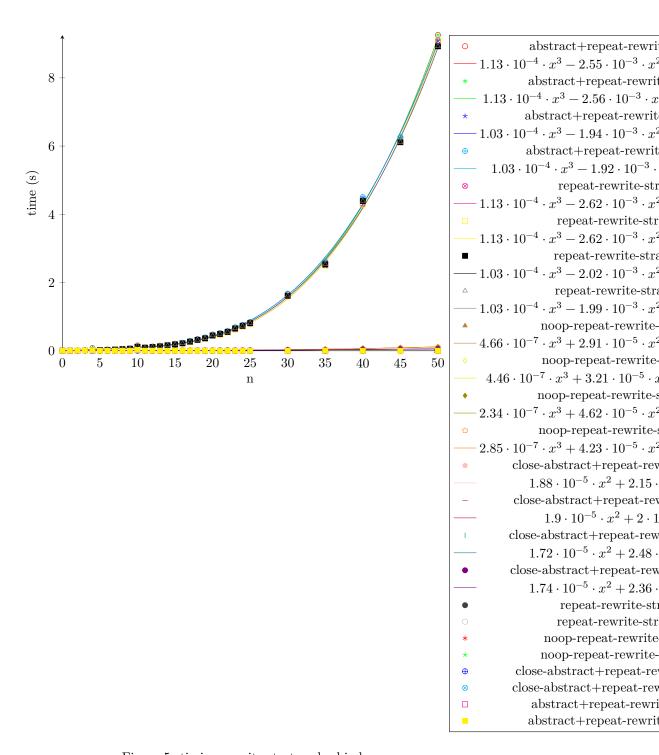
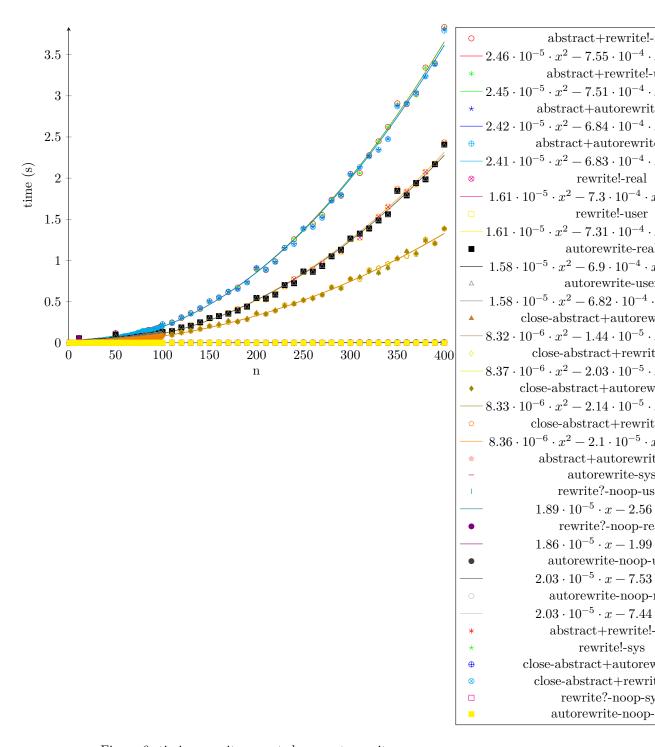


Figure 5: timing-rewrite-strat-under-binders



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

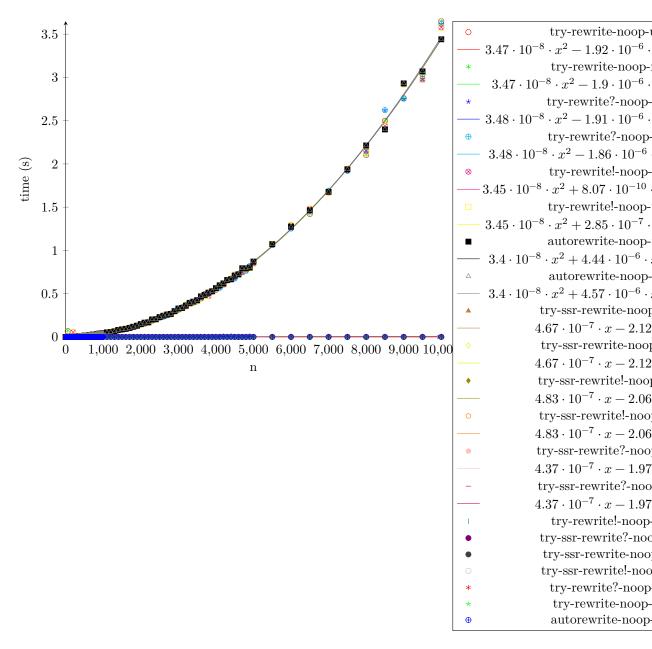


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

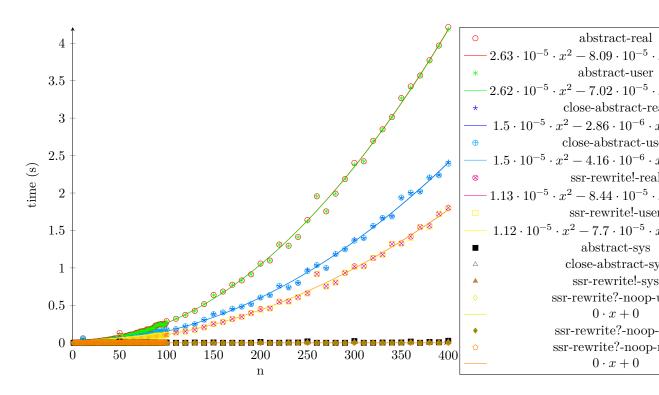


Figure 8: timing-rewrite-repeated-app-ssrrewrite

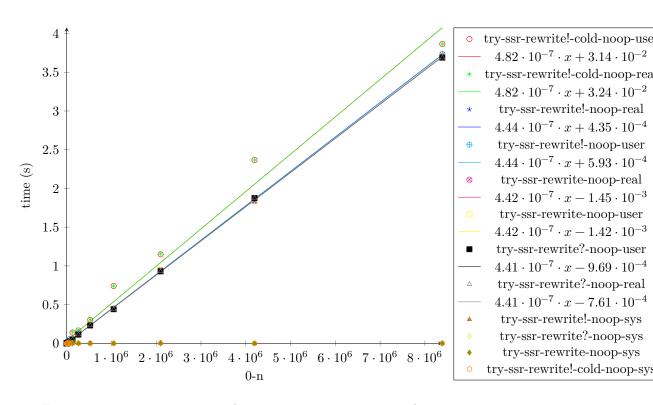


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

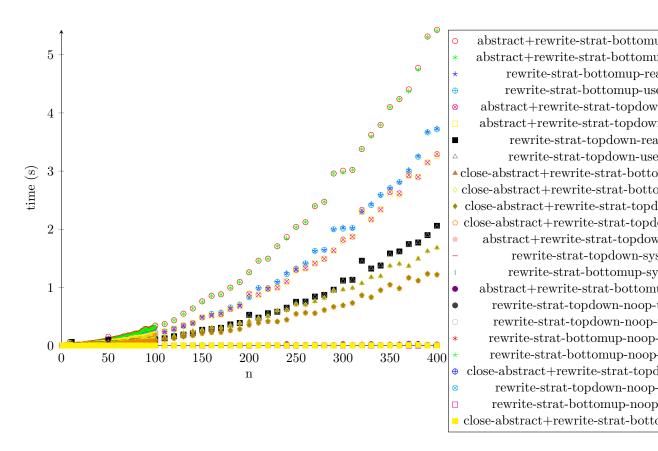


Figure 10: timing-rewrite-repeated-app-rewrite-strat

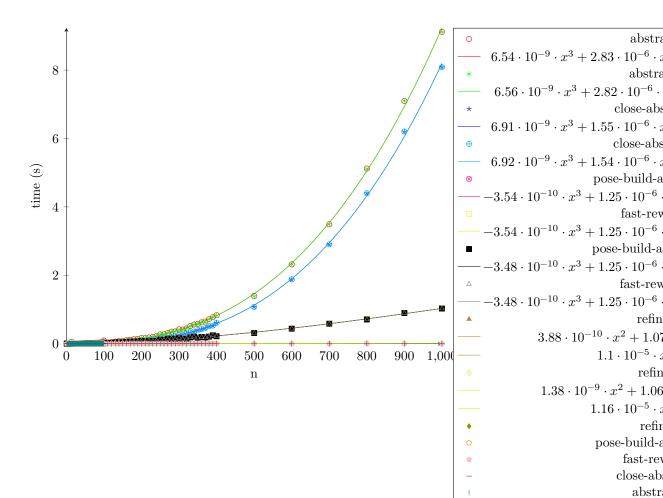
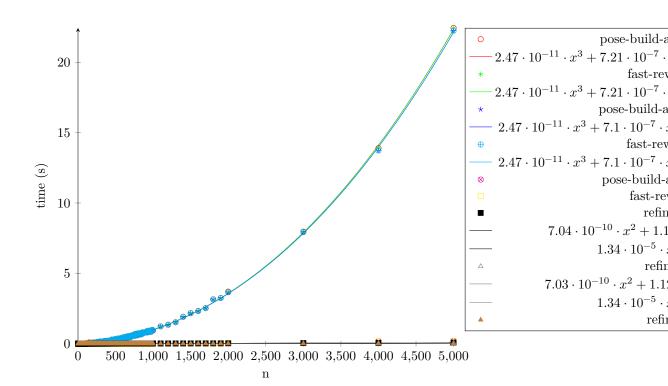
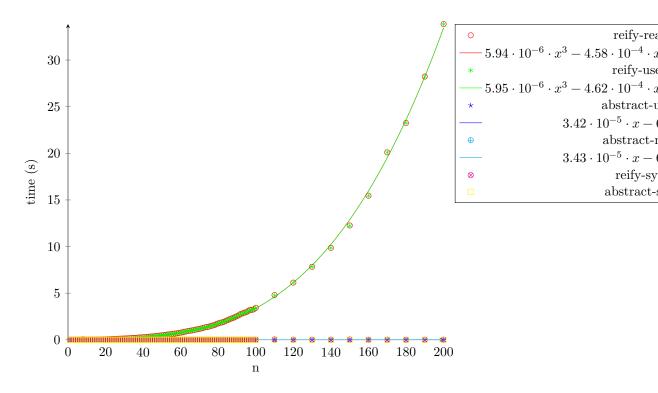


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

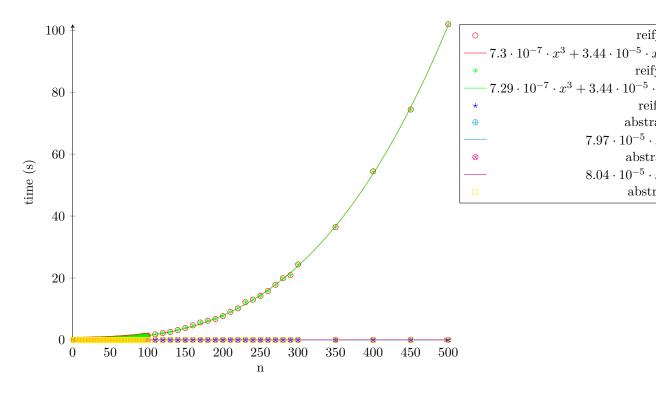
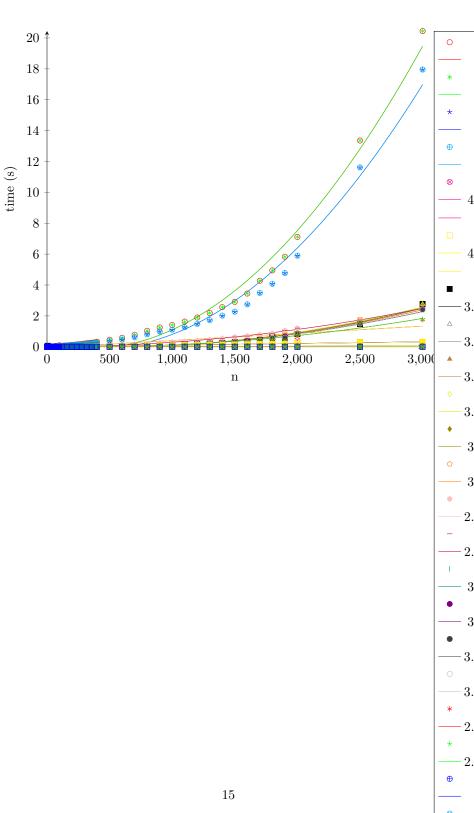


Figure 14: timing-typeclass-reification-let-in-PHOAS



abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

refine-user

refine-real

check-pf-cast-rea

check-pf-cast-use

type-admit-user

type-admit-real

type-admit-cast-us

type-admit-cast-re

close-abstract-use

close-abstract-rea

type-pf-cast-user

type-pf-cast-real

check-admit-cast-u

check-admit-cast-r

check-admit-user

check-admit-real

build-eval-thunk-re

 $1.08 \cdot 10^{-4} \cdot x - 6.73 \cdot$ build-thunk-real $1.07 \cdot 10^{-4} \cdot x - 7.8 \cdot$ build-eval-thunk-u $1.07 \cdot 10^{-4} \cdot x - 9.47 \cdot$ build-thunk-user $1.07 \cdot 10^{-4} \cdot x - 1.04 \cdot$

 $4.65 \cdot 10^{-4} \cdot x - 5.83$

 $4.65 \cdot 10^{-4} \cdot x - 5.83 \cdot$