

Figure 1: timing-pattern

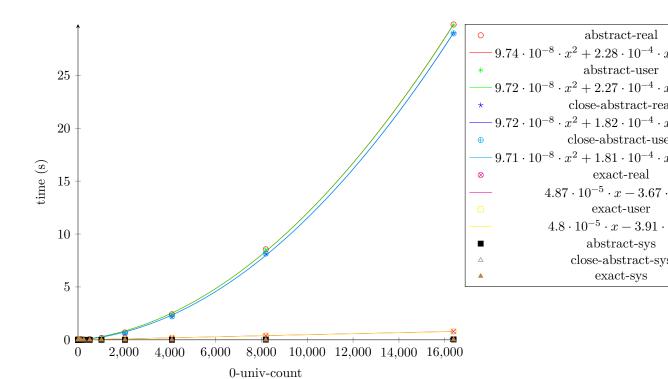


Figure 2: timing-n-polymorphic-universes param-1-n 0

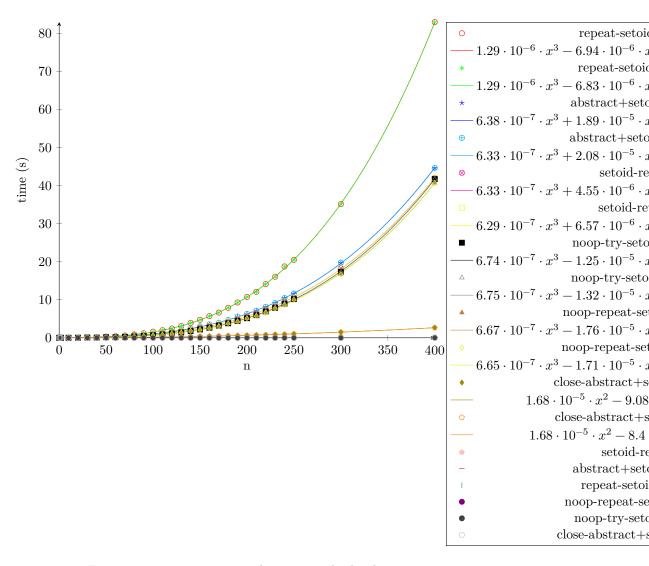


Figure 3: timing-repeat-setoid-rewrite-under-binders

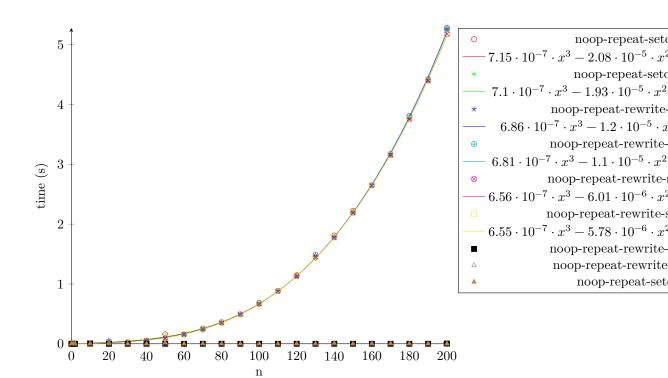


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

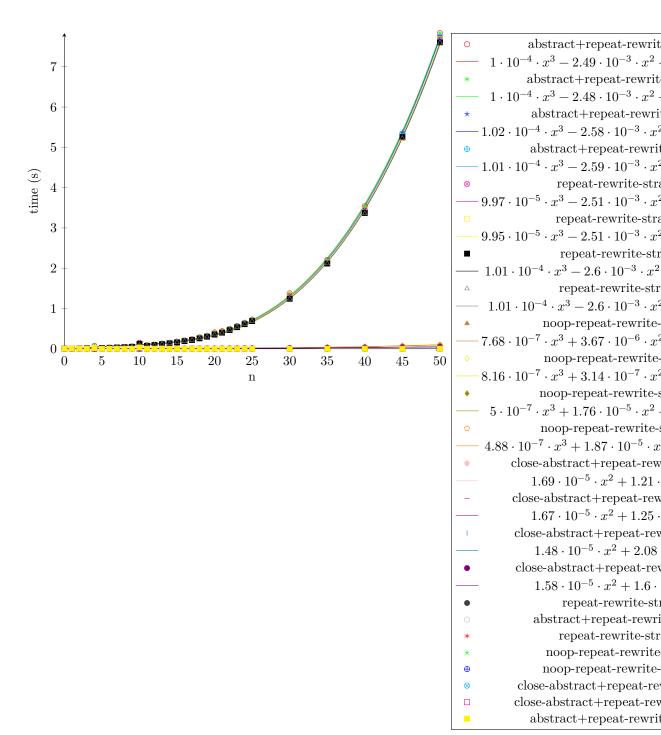


Figure 5: timing-rewrite-strat-under-binders

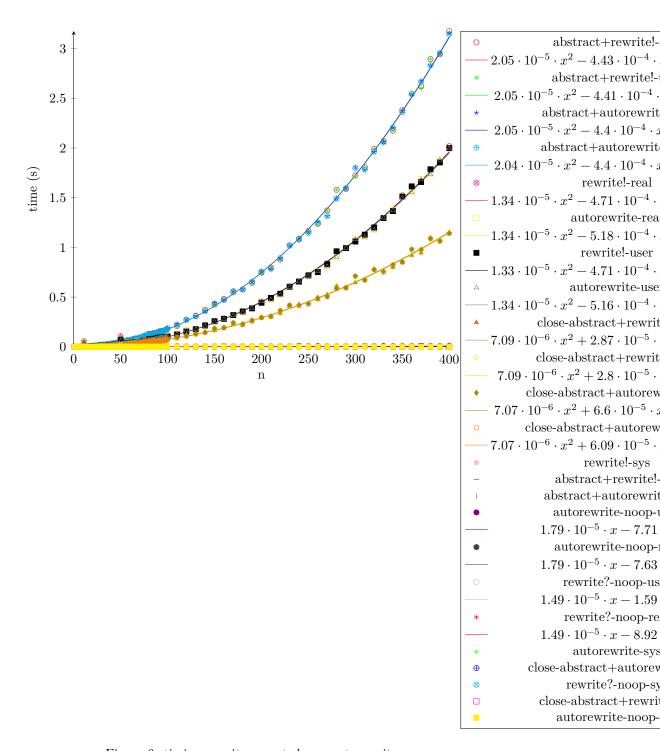


Figure 6: timing-rewrite-repeated-app-autorewrite

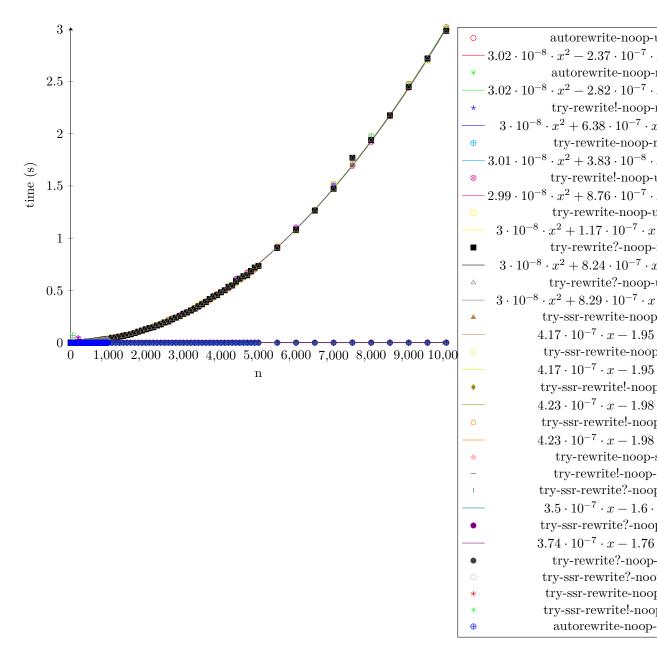


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

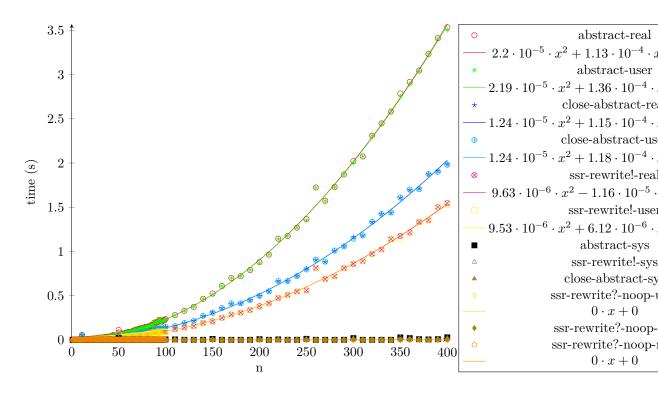


Figure 8: timing-rewrite-repeated-app-ssrrewrite

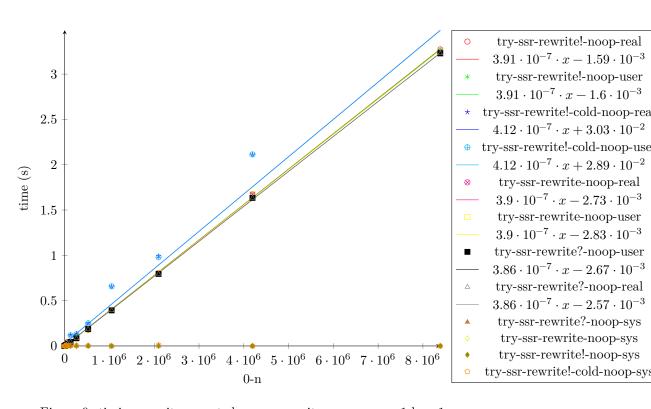


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

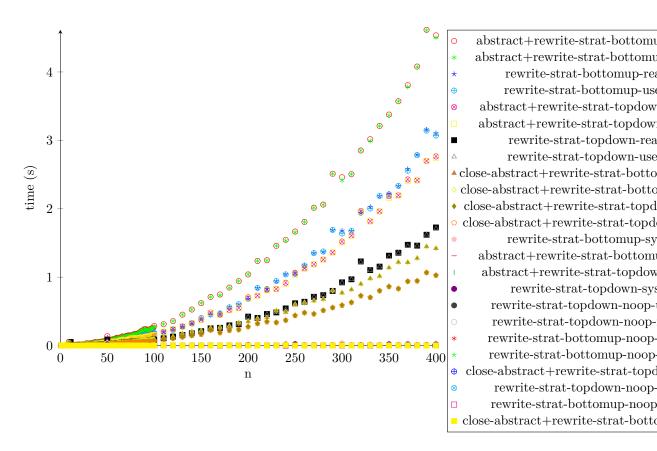


Figure 10: timing-rewrite-repeated-app-rewrite-strat

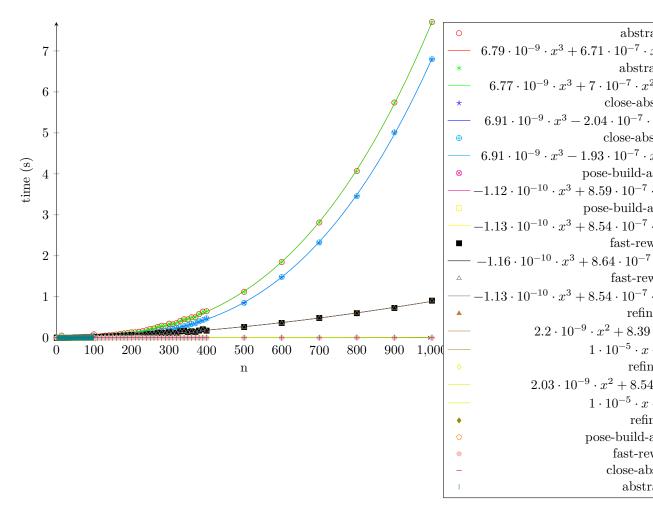
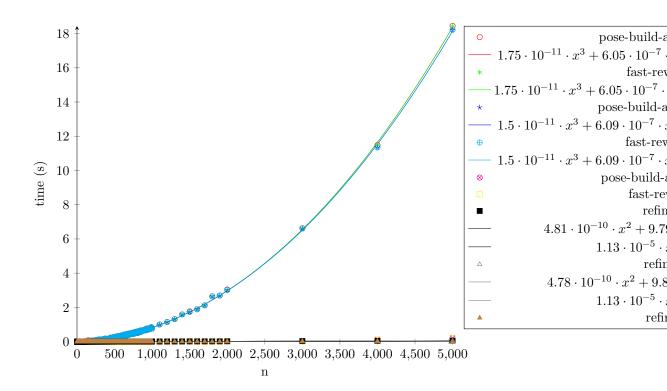
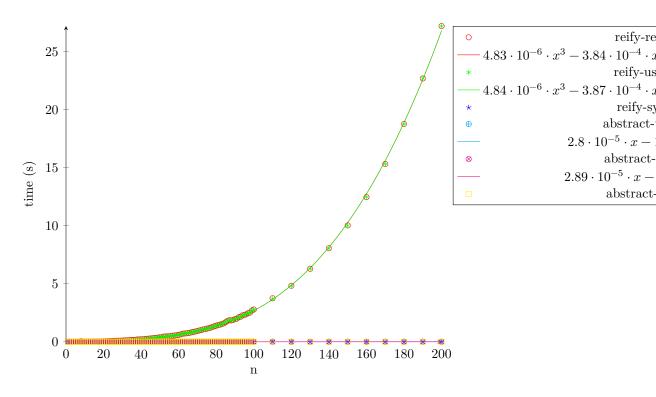


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

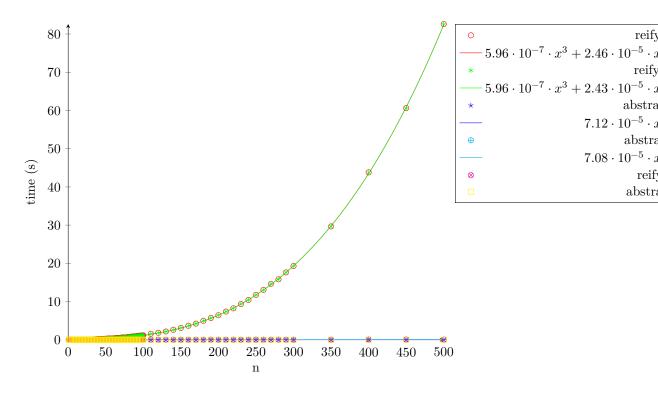
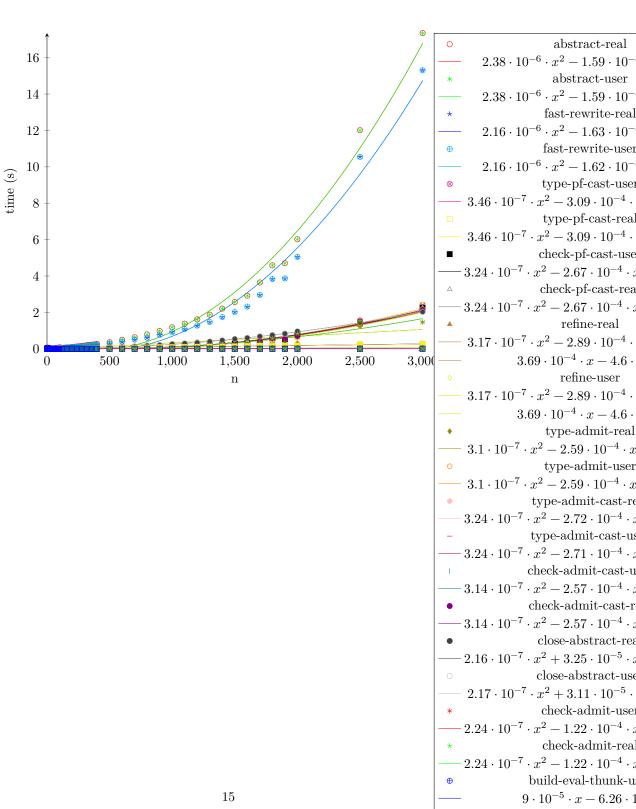


Figure 14: timing-typeclass-reification-let-in-PHOAS



check-admit-cast-r $3.14 \cdot 10^{-7} \cdot x^2 - 2.57 \cdot 10^{-4} \cdot x^2$ close-abstract-rea $2.16 \cdot 10^{-7} \cdot x^2 + 3.25 \cdot 10^{-5} \cdot x^2$ close-abstract-use $2.17 \cdot 10^{-7} \cdot x^2 + 3.11 \cdot 10^{-5} \cdot$ check-admit-user $2.24 \cdot 10^{-7} \cdot x^2 - 1.22 \cdot 10^{-4} \cdot x^2$ check-admit-real $2.24 \cdot 10^{-7} \cdot x^2 - 1.22 \cdot 10^{-4} \cdot x^2$ build-eval-thunk-ua

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

type-pf-cast-user

type-pf-cast-real

check-pf-cast-use

check-pf-cast-rea

refine-real

refine-user

type-admit-user

type-admit-cast-re

type-admit-cast-us

check-admit-cast-u

 $9 \cdot 10^{-5} \cdot x - 6.26 \cdot 1$ build-eval-thunk-re $9.02 \cdot 10^{-5} \cdot x - 4.61 \cdot$ build-thunk-user $8.93 \cdot 10^{-5} \cdot x - 6.73 \cdot$ build-thunk-real $8.94 \cdot 10^{-5} \cdot x - 5.23 \cdot$

 $3.69 \cdot 10^{-4} \cdot x - 4.6 \cdot$

 $3.69 \cdot 10^{-4} \cdot x - 4.6 \cdot$ type-admit-real

 $2.38 \cdot 10^{-6} \cdot x^2 - 1.59 \cdot 10^{-6}$

 $2.38 \cdot 10^{-6} \cdot x^2 - 1.59 \cdot 10^{-6}$

 $2.16 \cdot 10^{-6} \cdot x^2 - 1.63 \cdot 10^{-6}$

 $2.16 \cdot 10^{-6} \cdot x^2 - 1.62 \cdot 10^{-6}$