

Figure 1: timing-pattern

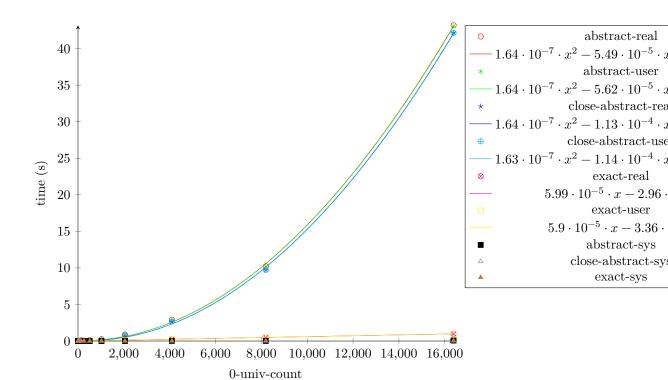


Figure 2: timing-n-polymorphic-universes param-1-n 0

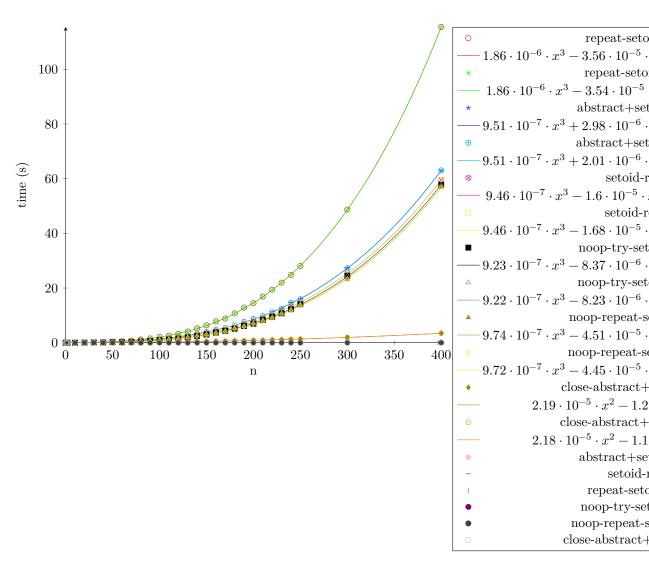


Figure 3: timing-repeat-setoid-rewrite-under-binders

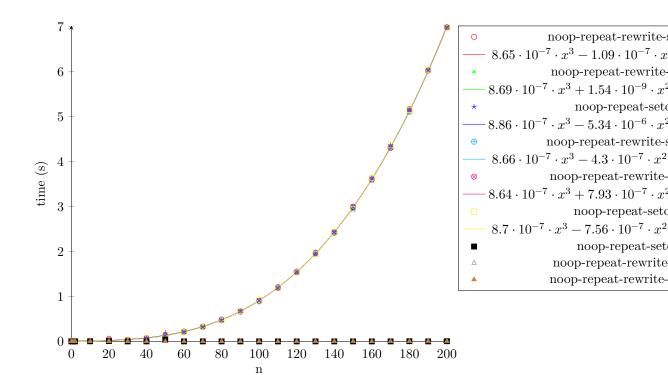


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

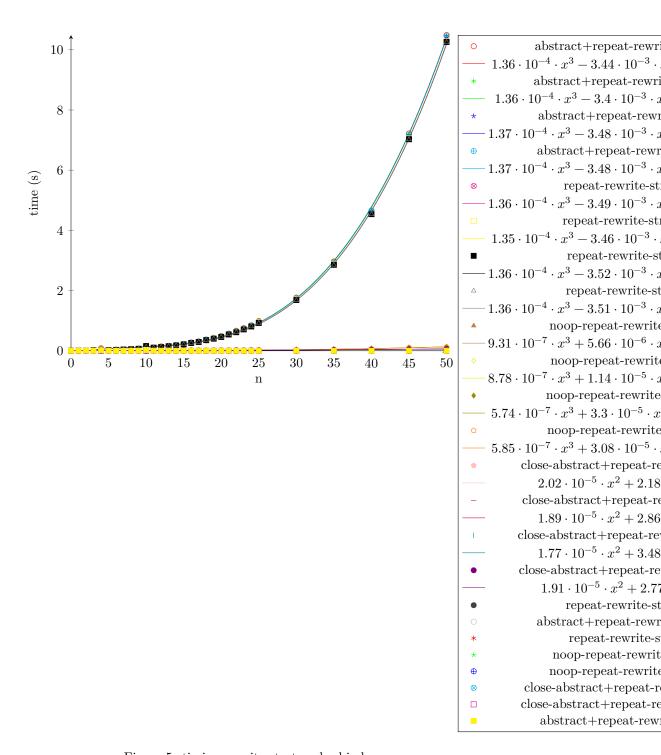
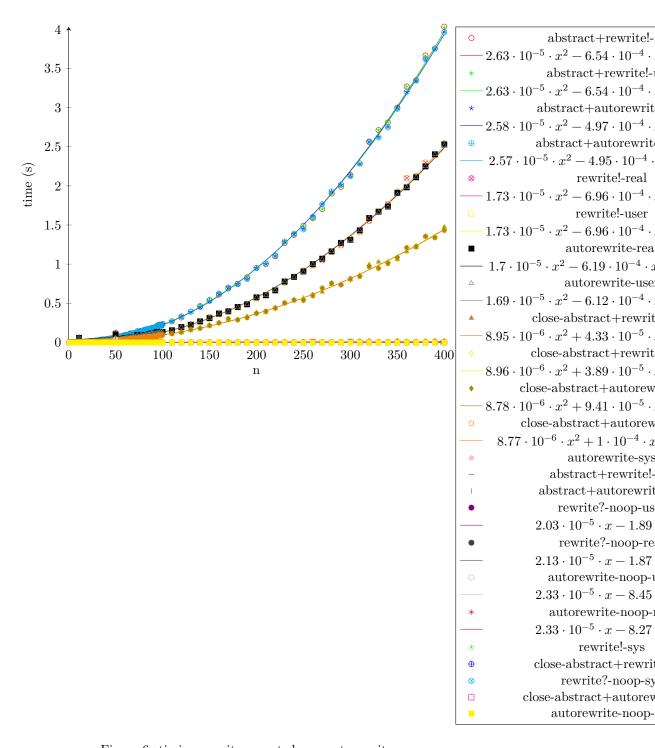


Figure 5: timing-rewrite-strat-under-binders



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

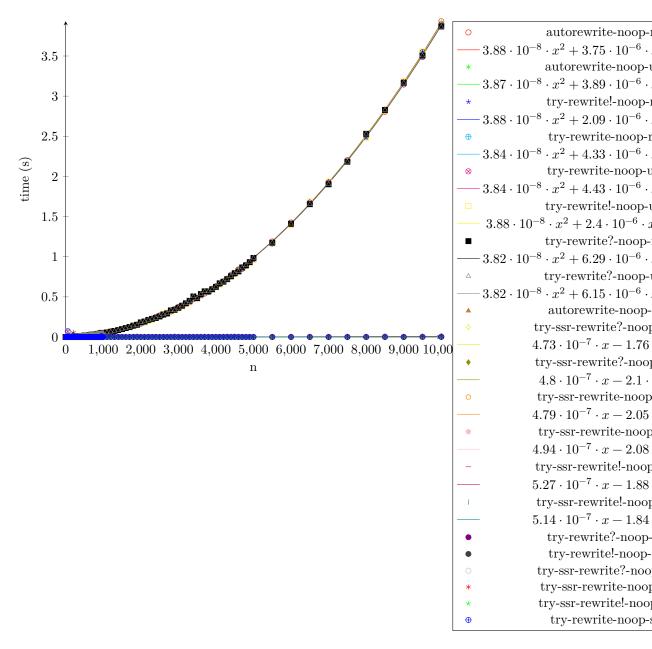
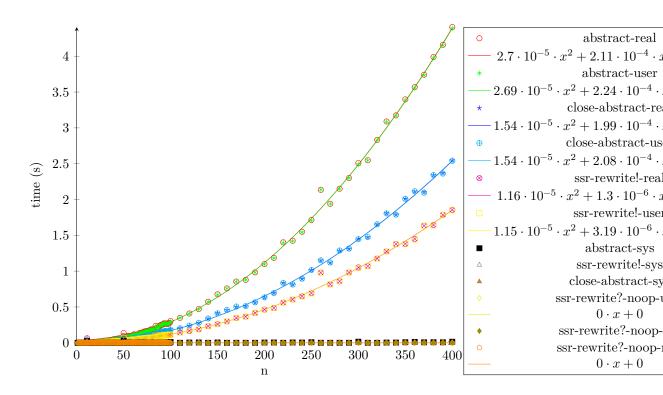


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

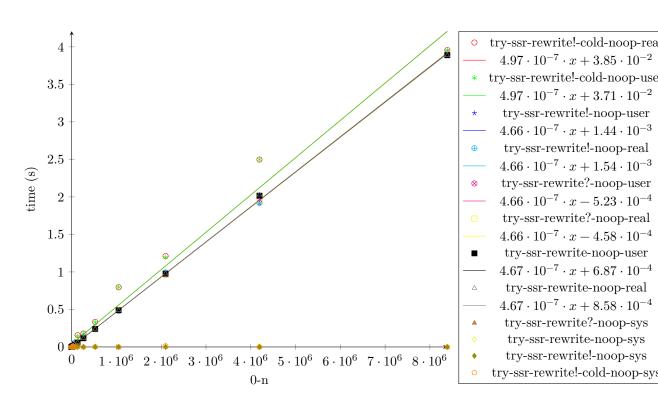


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

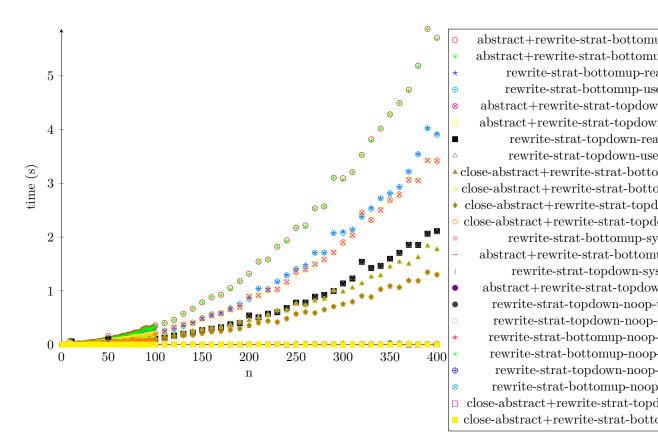
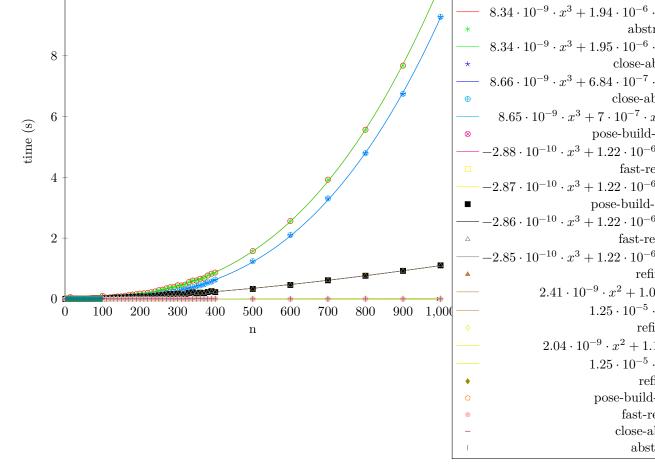


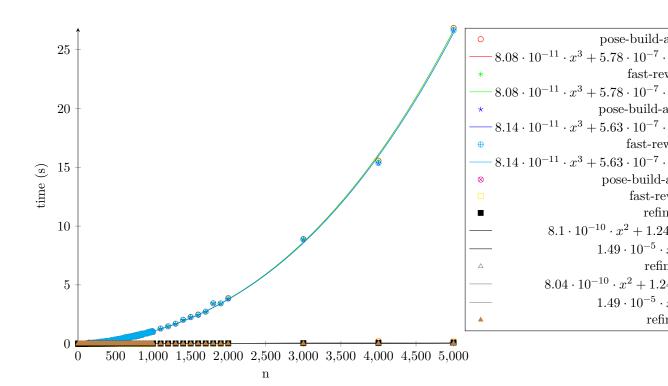
Figure 10: timing-rewrite-repeated-app-rewrite-strat



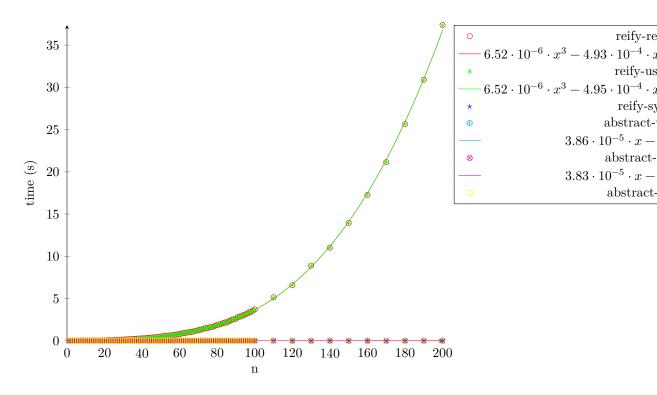
abst

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

10 -



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



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

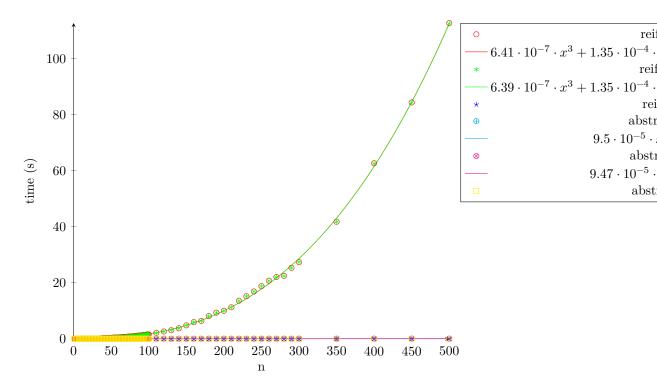
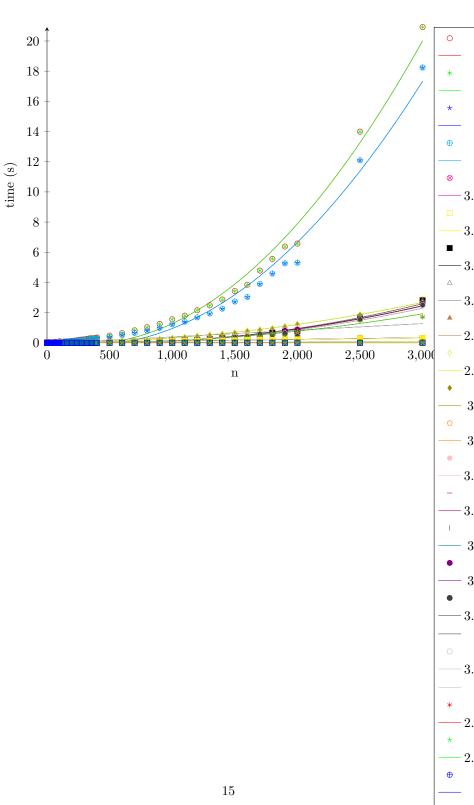


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.76 \cdot 10^{-6} \cdot x^2 - 1.65 \cdot 10^{-6}$ $2.76 \cdot 10^{-6} \cdot x^2 - 1.65 \cdot 10^{-6}$ $2.47 \cdot 10^{-6} \cdot x^2 - 1.69 \cdot 10^{-6}$ $2.47 \cdot 10^{-6} \cdot x^2 - 1.69 \cdot 10^{-6}$ $3.91 \cdot 10^{-7} \cdot x^2 - 3.18 \cdot 10^{-4} \cdot x^2$ $3.91 \cdot 10^{-7} \cdot x^2 - 3.18 \cdot 10^{-4} \cdot x^2$ $3.95 \cdot 10^{-7} \cdot x^2 - 3.31 \cdot 10^{-4} \cdot x^2$ $3.95 \cdot 10^{-7} \cdot x^2 - 3.31 \cdot 10^{-4} \cdot x^2$ $2.84 \cdot 10^{-7} \cdot x^2 + 3.97 \cdot 10^{-5} \cdot x^2$ $2.84 \cdot 10^{-7} \cdot x^2 + 4.06 \cdot 10^{-5} \cdot x^2$ $3.6 \cdot 10^{-7} \cdot x^2 - 2.76 \cdot 10^{-4} \cdot x$ $3.6 \cdot 10^{-7} \cdot x^2 - 2.76 \cdot 10^{-4} \cdot x$ $3.69 \cdot 10^{-7} \cdot x^2 - 2.97 \cdot 10^{-4} \cdot x^2$ $3.69 \cdot 10^{-7} \cdot x^2 - 2.97 \cdot 10^{-4} \cdot x^2$ $3.6 \cdot 10^{-7} \cdot x^2 - 2.68 \cdot 10^{-4} \cdot x$ $3.6 \cdot 10^{-7} \cdot x^2 - 2.68 \cdot 10^{-4} \cdot x$ $3.41 \cdot 10^{-7} \cdot x^2 - 2.65 \cdot 10^{-4} \cdot x^2$ $3.41 \cdot 10^{-7} \cdot x^2 - 2.66 \cdot 10^{-4} \cdot x^2$ $2.56 \cdot 10^{-7} \cdot x^2 - 1.32 \cdot 10^{-4} \cdot x^2$ $2.56 \cdot 10^{-7} \cdot x^2 - 1.32 \cdot 10^{-4} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

check-pf-cast-use

check-pf-cast-rea

check-admit-cast-u

check-admit-cast-r

close-abstract-use

close-abstract-rea

type-pf-cast-user

type-pf-cast-real

type-admit-cast-us

type-admit-cast-re

type-admit-user

type-admit-real

refine-real

 $4.42 \cdot 10^{-4} \cdot x - 5.29 \cdot$ refine-user

 $4.42 \cdot 10^{-4} \cdot x - 5.3 \cdot$ check-admit-user

check-admit-real

build-eval-thunk-re

 $1.14 \cdot 10^{-4} \cdot x - 3.97$ build-thunk-real $1.13 \cdot 10^{-4} \cdot x - 4.78 \cdot$ build-eval-thunk-u $1.13 \cdot 10^{-4} \cdot x - 3.96 \cdot$ build-thunk-user $1.13 \cdot 10^{-4} \cdot x - 5.06$ shool. I wasn