

Figure 1: timing-pattern

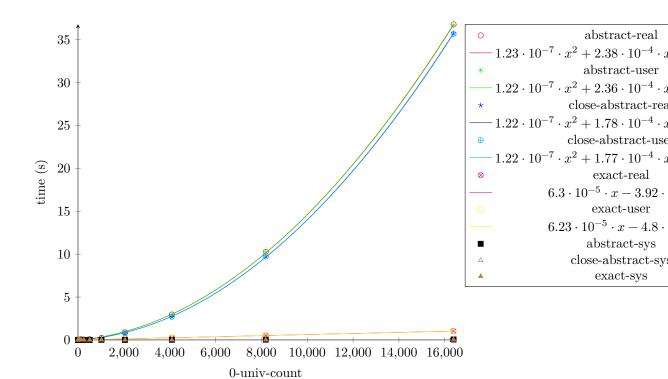


Figure 2: timing-n-polymorphic-universes param-1-n 0

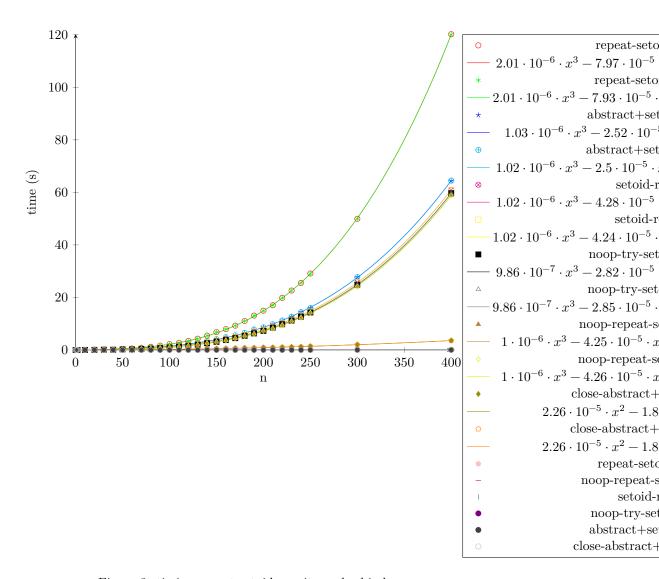


Figure 3: timing-repeat-setoid-rewrite-under-binders

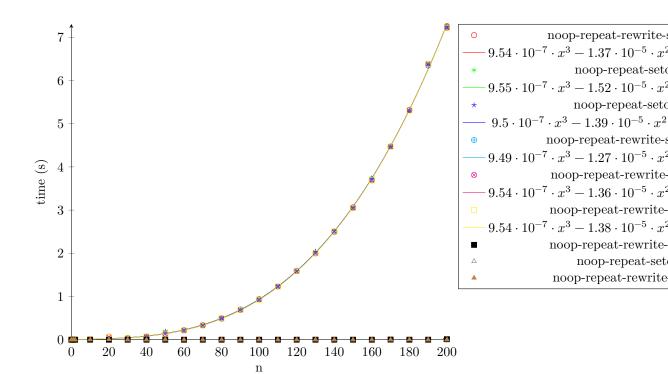


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

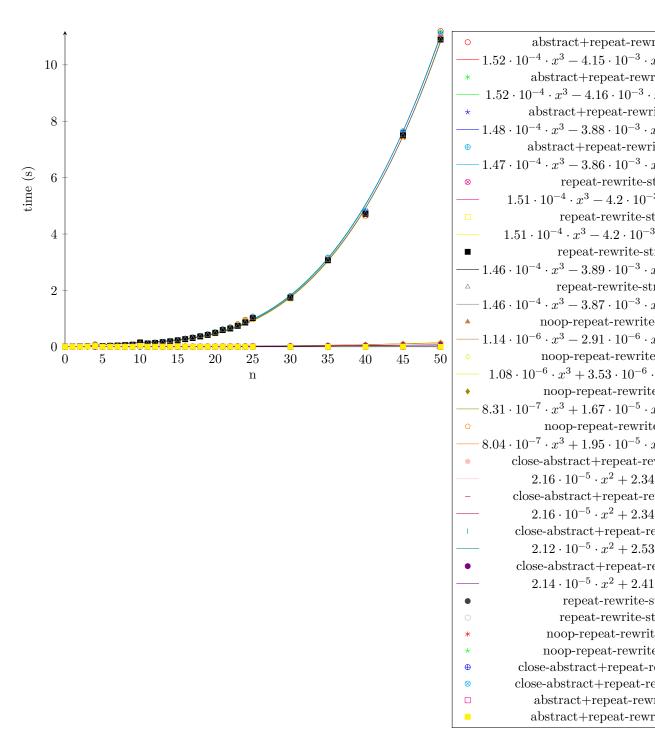
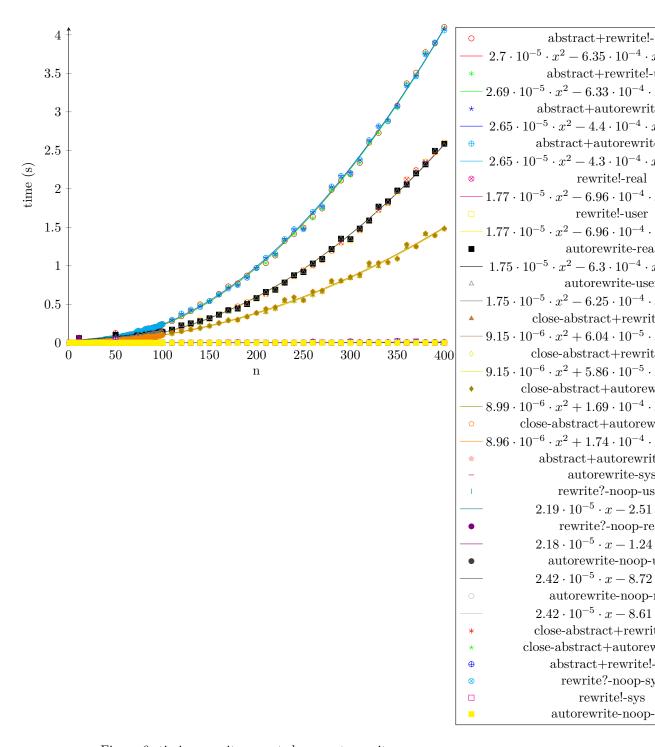


Figure 5: timing-rewrite-strat-under-binders



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

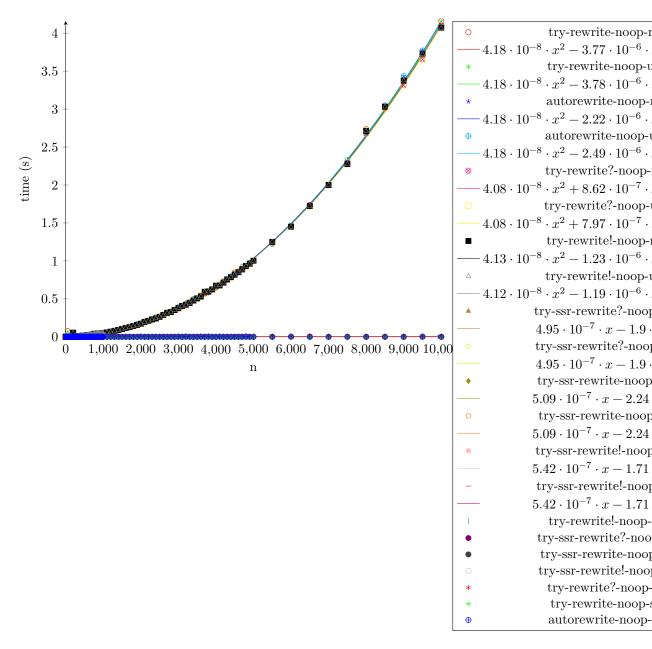
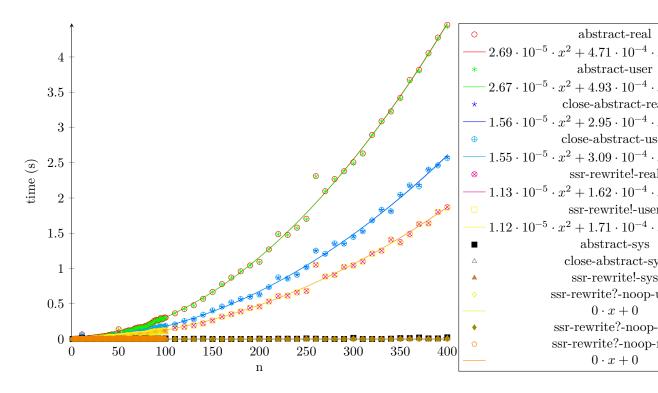


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



 $Figure~8:~timing\mbox{-rewrite-repeated-app-ssrrewrite}$

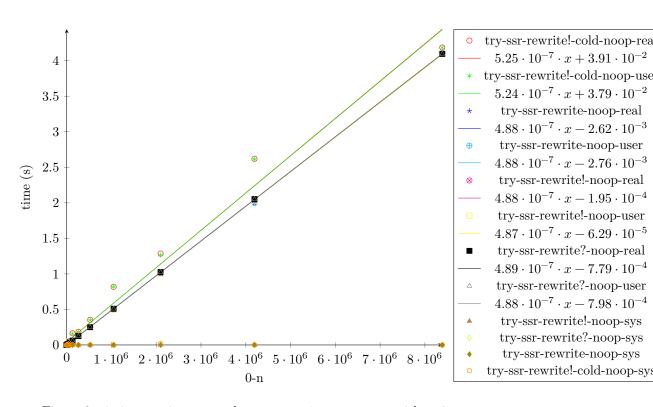


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

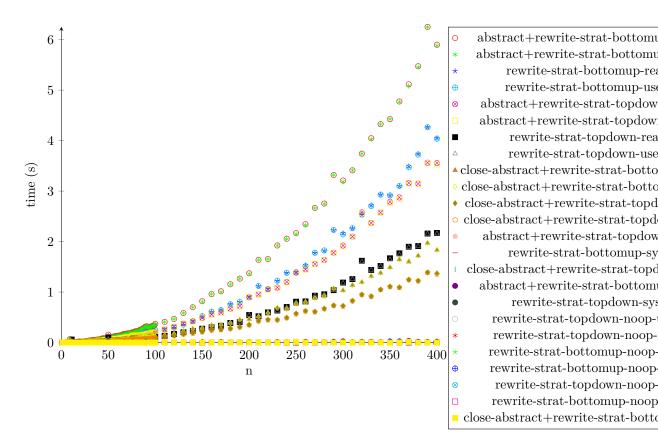


Figure 10: timing-rewrite-repeated-app-rewrite-strat

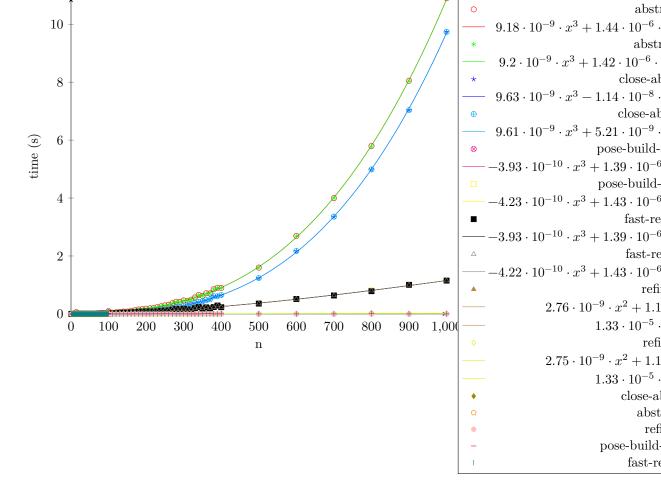


Figure 11: timing-rewrite-repeated-app-fast-rewrite

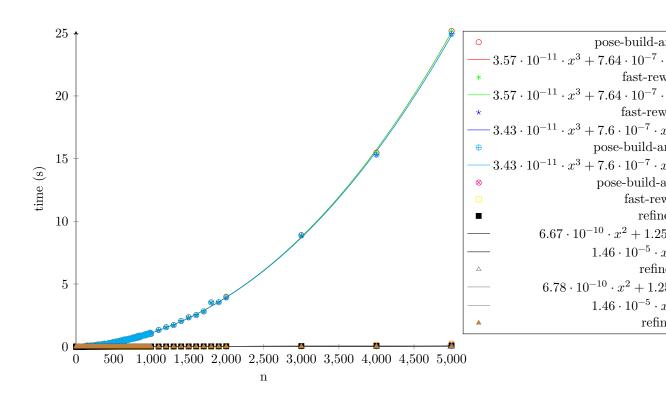
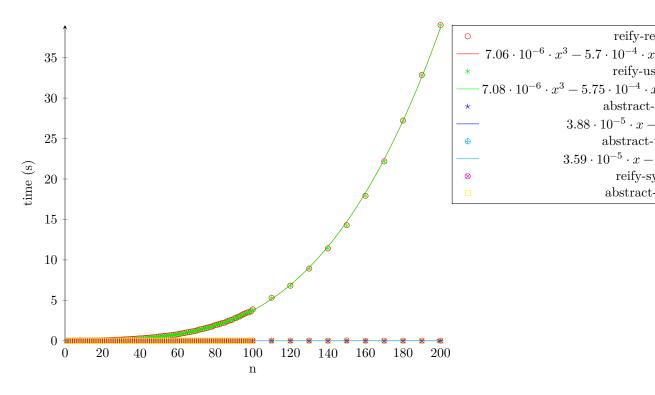
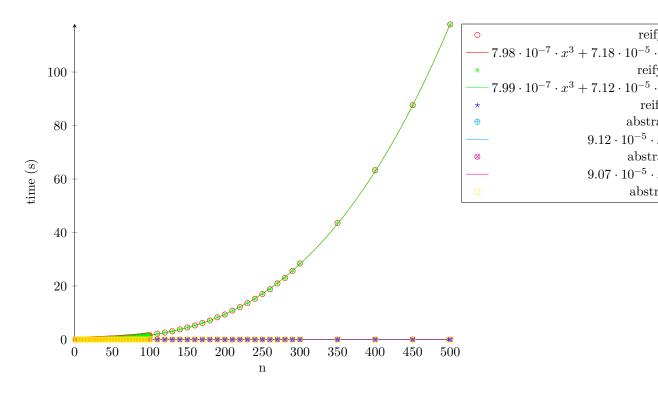


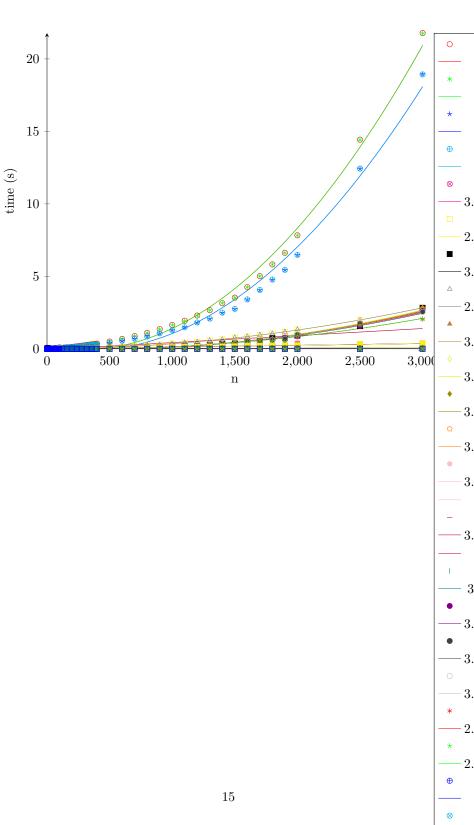
Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract



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



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



 $2.84 \cdot 10^{-6} \cdot x^2 - 1.6 \cdot 10^{-3}$ $2.84 \cdot 10^{-6} \cdot x^2 - 1.6 \cdot 10^{-3}$ $2.54 \cdot 10^{-6} \cdot x^2 - 1.66 \cdot 10^{-6}$ $2.54 \cdot 10^{-6} \cdot x^2 - 1.65 \cdot 10^{-6}$ $3.81 \cdot 10^{-7} \cdot x^2 - 2.86 \cdot 10^{-4} \cdot x^2$ $2.98 \cdot 10^{-7} \cdot x^2 + 5.36 \cdot 10^{-5} \cdot x^2 + 5.36 \cdot 10^{-5}$ $3.81 \cdot 10^{-7} \cdot x^2 - 2.85 \cdot 10^{-4} \cdot x^2$ $2.97 \cdot 10^{-7} \cdot x^2 + 5.32 \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot$ $3.93 \cdot 10^{-7} \cdot x^2 - 2.98 \cdot 10^{-4} \cdot x^2 = 2.98 \cdot 10^{-4} \cdot x^2 + 2.98 \cdot 10^{-4} \cdot x^2$ $3.92 \cdot 10^{-7} \cdot x^2 - 2.97 \cdot 10^{-4} \cdot x^2$ $3.93 \cdot 10^{-7} \cdot x^2 - 3.17 \cdot 10^{-4} \cdot x^2$ $3.94 \cdot 10^{-7} \cdot x^2 - 3.18 \cdot 10^{-4} \cdot x^2$ $3.79 \cdot 10^{-7} \cdot x^2 - 3.01 \cdot 10^{-4} \cdot x^2$ $3.79 \cdot 10^{-7} \cdot x^2 - 3.02 \cdot 10^{-4} \cdot x^2$ $3.56 \cdot 10^{-7} \cdot x^2 - 2.57 \cdot 10^{-4}$ $3.55 \cdot 10^{-7} \cdot x^2 - 2.56 \cdot 10^{-4} \cdot x^2$ $3.55 \cdot 10^{-7} \cdot x^2 - 2.45 \cdot 10^{-4} \cdot x^2$ $3.55 \cdot 10^{-7} \cdot x^2 - 2.45 \cdot 10^{-4} \cdot x^2$ $2.82 \cdot 10^{-7} \cdot x^2 - 1.51 \cdot 10^{-4} \cdot x^2$ $2.82 \cdot 10^{-7} \cdot x^2 - 1.51 \cdot 10^{-4} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

check-pf-cast-rea

close-abstract-rea

check-pf-cast-use

close-abstract-use

type-admit-real

type-admit-user

check-admit-cast-r

check-admit-cast-u

 $4.85 \cdot 10^{-4} \cdot x - 5.88 \cdot$ refine-user

 $4.85 \cdot 10^{-4} \cdot x - 5.89 \cdot$ type-pf-cast-real

type-pf-cast-user

type-admit-cast-us

type-admit-cast-re

check-admit-real

check-admit-user

build-eval-thunk-ua

 $1.21 \cdot 10^{-4} \cdot x - 1.06$ build-eval-thunk-re $1.21 \cdot 10^{-4} \cdot x - 7.78 \cdot$ build-thunk-user $1.2 \cdot 10^{-4} \cdot x - 1.15 \cdot$ build-thunk-real $1.2 \cdot 10^{-4} \cdot x - 8.73 \cdot$ oboole I ...

refine-real