

Figure 1: timing-pattern

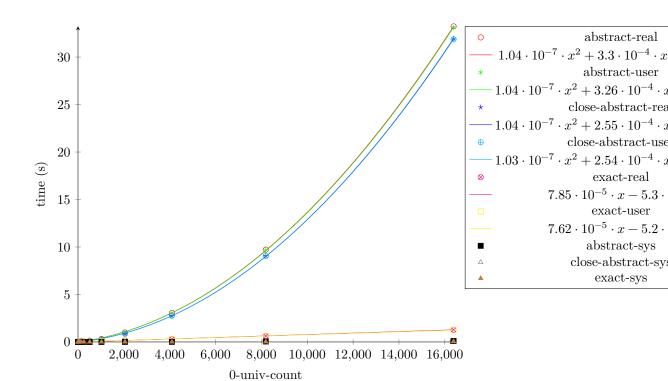


Figure 2: timing-n-polymorphic-universes param-1-n 0

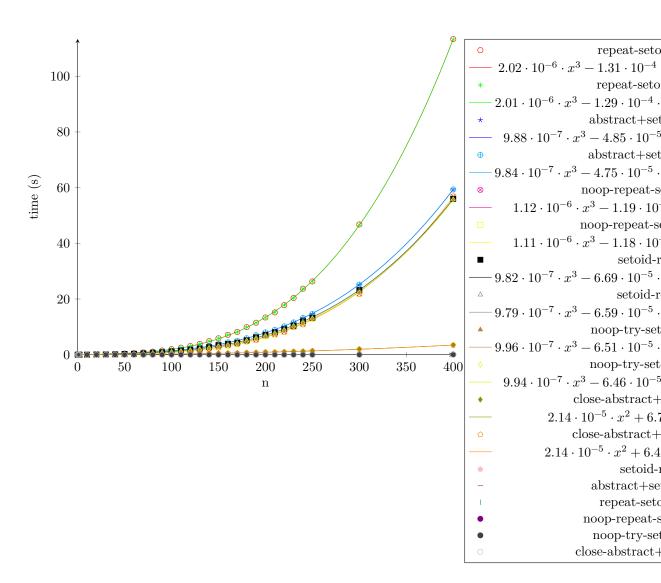


Figure 3: timing-repeat-setoid-rewrite-under-binders

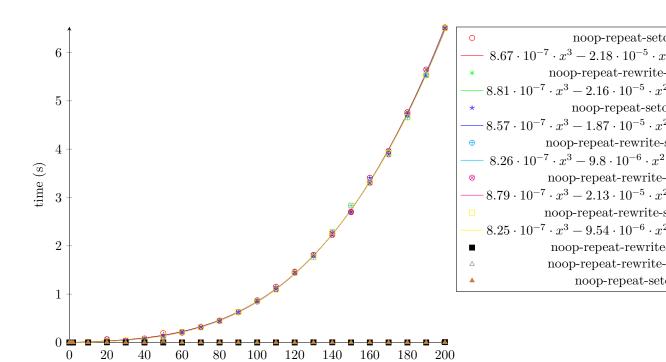


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

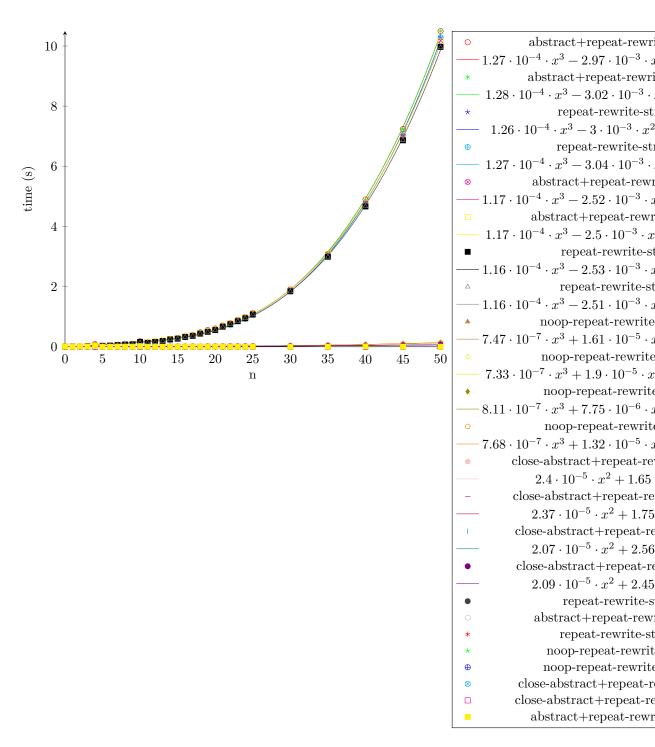
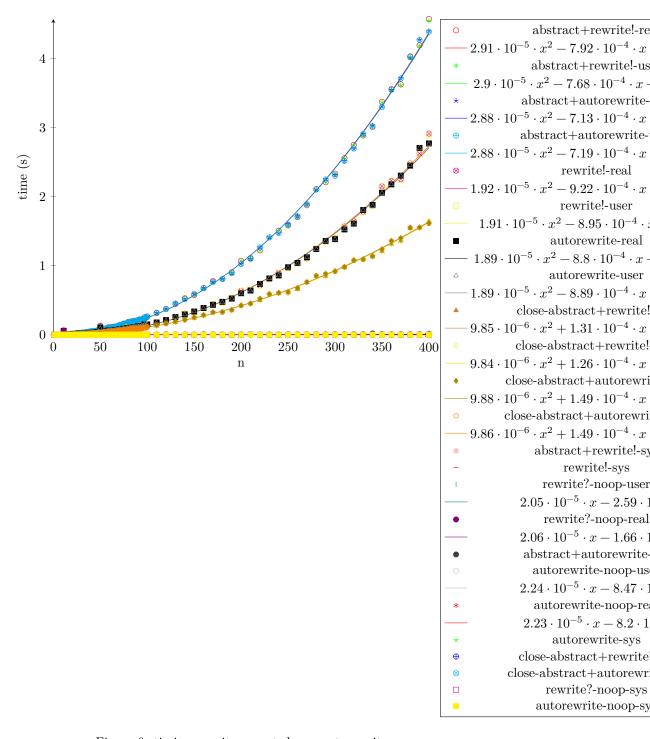


Figure 5: timing-rewrite-strat-under-binders



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

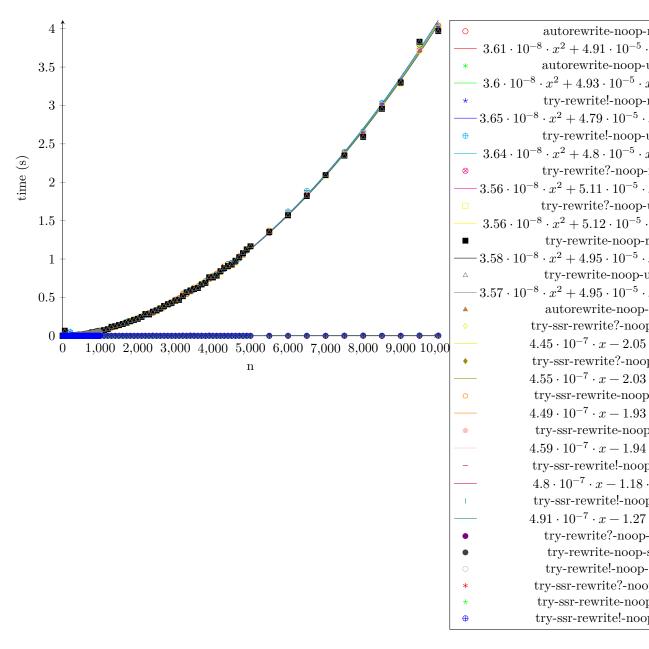


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

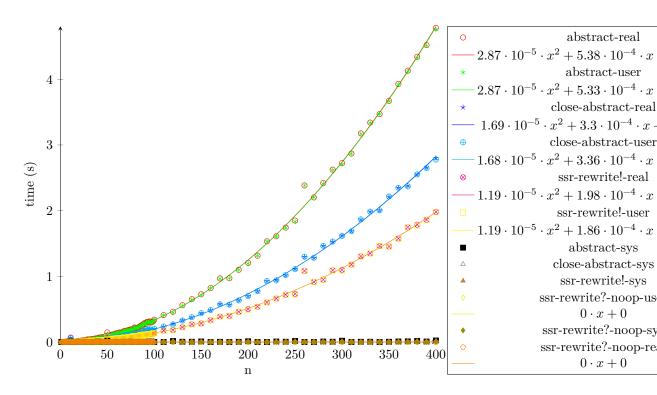


Figure 8: timing-rewrite-repeated-app-ssrrewrite

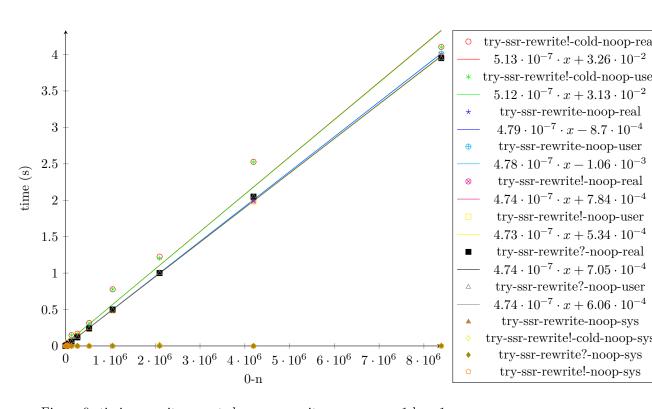


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

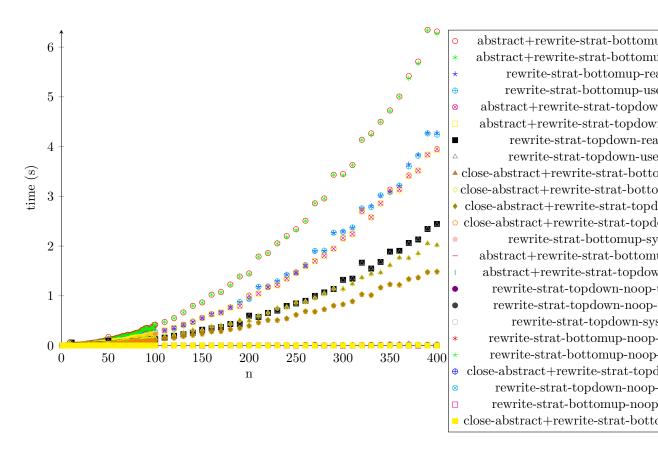
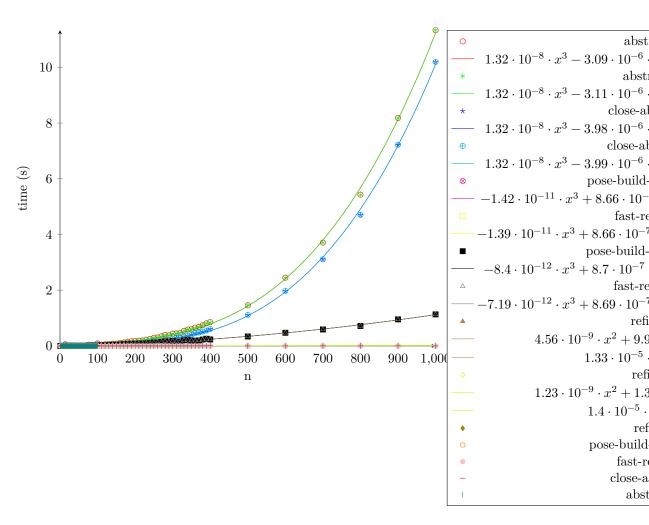


Figure 10: timing-rewrite-repeated-app-rewrite-strat



abst

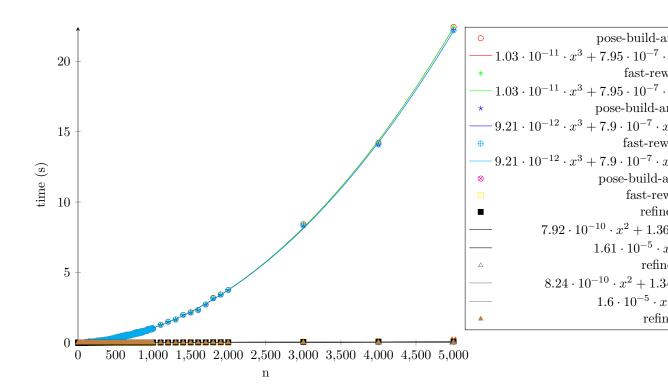
abst

ref

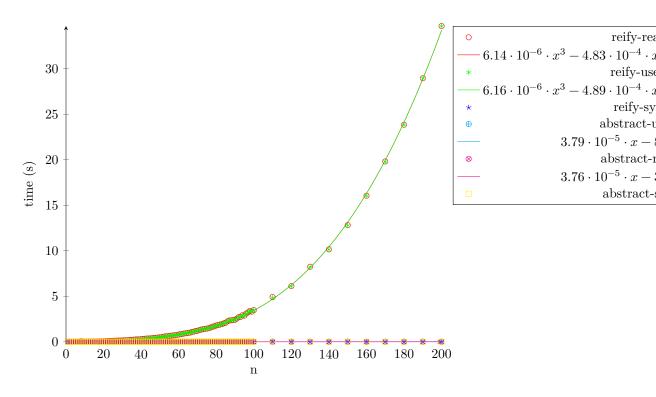
fast-re

abst

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



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



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

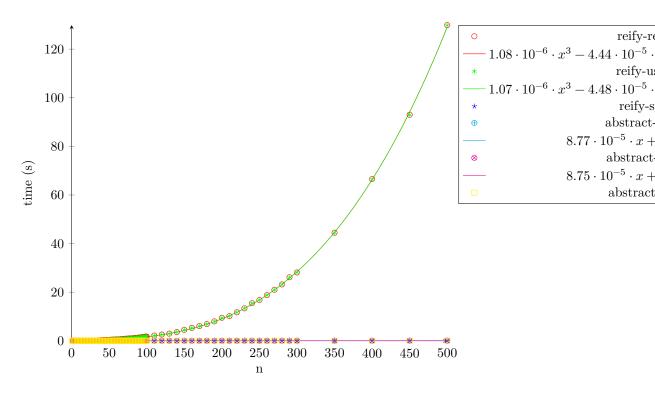
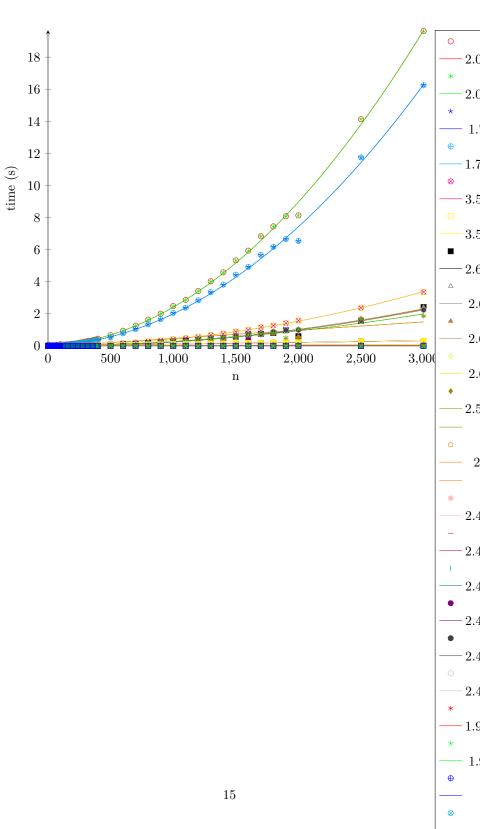


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.07 \cdot 10^{-6} \cdot x^2 + 3.41 \cdot 10^{-4} \cdot x^2$ $2.07 \cdot 10^{-6} \cdot x^2 + 3.41 \cdot 10^{-4} \cdot x^2$ $1.72 \cdot 10^{-6} \cdot x^2 + 2.8 \cdot 10^{-4} \cdot x$ $1.72 \cdot 10^{-6} \cdot x^2 + 2.79 \cdot 10^{-4} \cdot x^2$ $3.56 \cdot 10^{-7} \cdot x^2 + 5.98 \cdot 10^{-5} \cdot x^2$ $3.55 \cdot 10^{-7} \cdot x^2 + 5.99 \cdot 10^{-5} \cdot x^2$ $2.67 \cdot 10^{-7} \cdot x^2 - 3.23 \cdot 10^{-5} \cdot x^2$ $2.67 \cdot 10^{-7} \cdot x^2 - 3.3 \cdot 10^{-5} \cdot x$ $2.6 \cdot 10^{-7} \cdot x^2 - 2.58 \cdot 10^{-6} \cdot x$ $2.6\cdot 10^{-7}\cdot x^2 - 2.18\cdot 10^{-6}\cdot x$ $2.51 \cdot 10^{-7} \cdot x^2 - 5.41 \cdot 10^{-6} \cdot x^2$ $5.17 \cdot 10^{-4} \cdot x - 5.51 \cdot$ $2.51 \cdot 10^{-7} \cdot x^2 - 6 \cdot 10^{-6} \cdot x$ $5.16 \cdot 10^{-4} \cdot x - 5.51 \cdot$ $2.49 \cdot 10^{-7} \cdot x^2 + 1.64 \cdot 10^{-5} \cdot x^2$ $2.49 \cdot 10^{-7} \cdot x^2 + 1.67 \cdot 10^{-5} \cdot x^2$ $2.49 \cdot 10^{-7} \cdot x^2 + 9.35 \cdot 10^{-6} \cdot x^2$ $2.49 \cdot 10^{-7} \cdot x^2 + 9.15 \cdot 10^{-6} \cdot x^2$ $2.44 \cdot 10^{-7} \cdot x^2 + 2.59 \cdot 10^{-5} \cdot x^2$ $2.43 \cdot 10^{-7} \cdot x^2 + 2.63 \cdot 10^{-5} \cdot x^2 + 2.63 \cdot 10^{-5}$ $1.96 \cdot 10^{-7} \cdot x^2 + 8.07 \cdot 10^{-5} \cdot x^2$ $1.95 \cdot 10^{-7} \cdot x^2 + 8.14 \cdot 10^{-5}$ $1.09 \cdot 10^{-4} \cdot x - 4.31 \cdot$ $1.08 \cdot 10^{-4} \cdot x - 5.87 \cdot$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-rea

close-abstract-use

type-admit-cast-re

type-admit-cast-us

type-admit-user

type-admit-real

refine-real

refine-user

check-pf-cast-rea

check-pf-cast-use

check-admit-cast-r

check-admit-cast-u

type-pf-cast-user

type-pf-cast-real

check-admit-real

check-admit-user

build-eval-thunk-re

build-eval-thunk-u

build-thunk-user $1.08 \cdot 10^{-4} \cdot x - 6.85$ build-thunk-real $1.08 \cdot 10^{-4} \cdot x - 5.2 \cdot$ aboolt I ugan