

Figure 1: timing-pattern

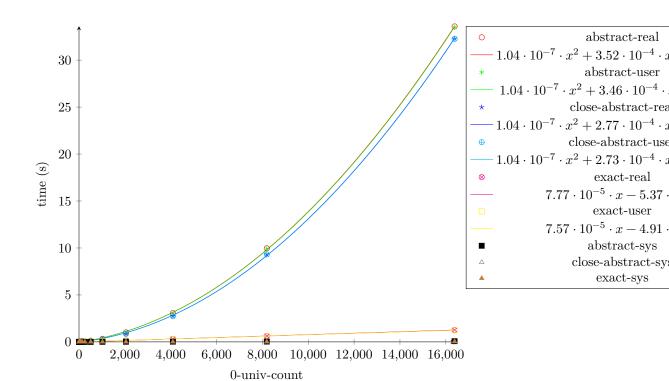


Figure 2: timing-n-polymorphic-universes param-1-n 0

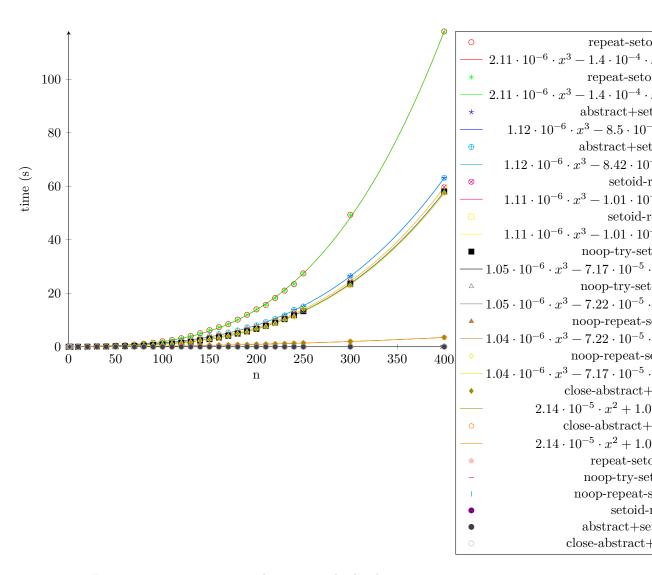


Figure 3: timing-repeat-setoid-rewrite-under-binders

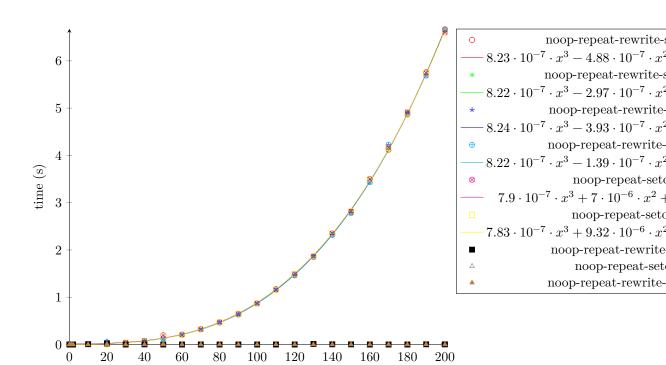


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

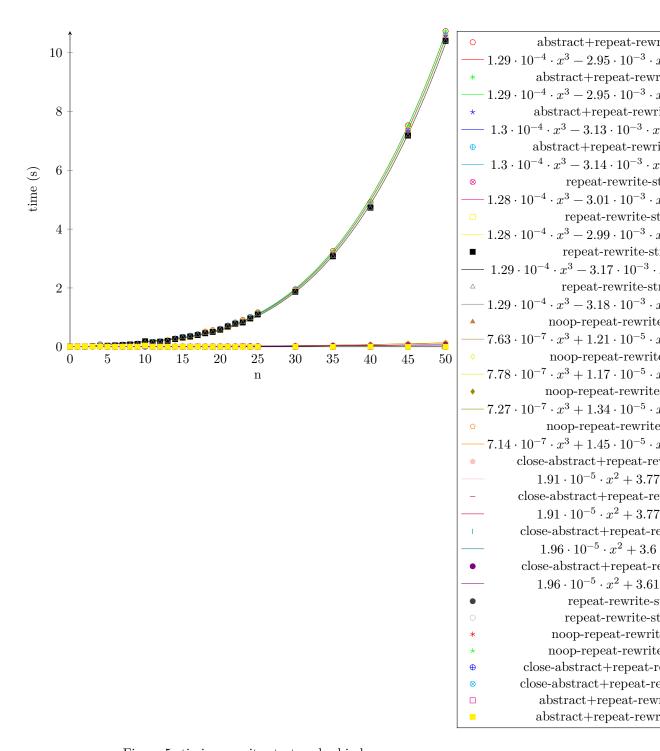


Figure 5: timing-rewrite-strat-under-binders

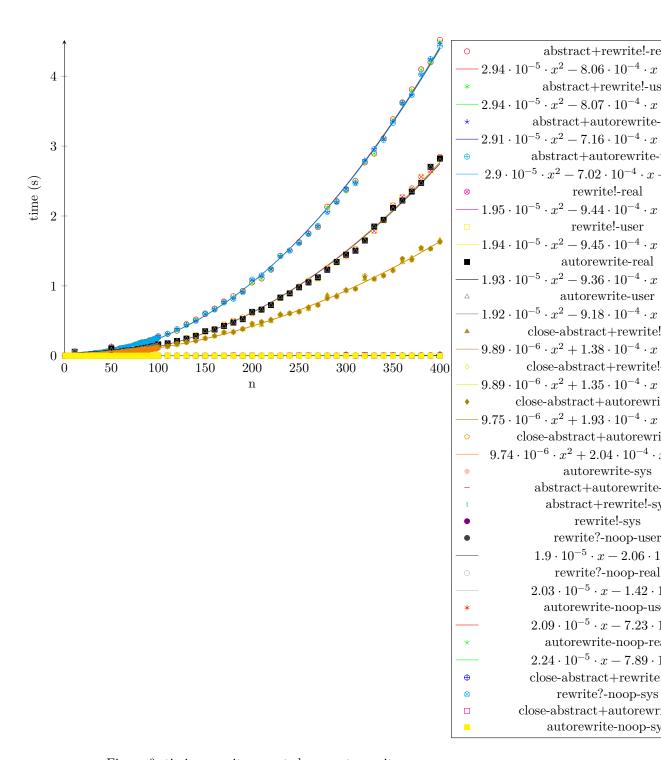


Figure 6: timing-rewrite-repeated-app-autorewrite

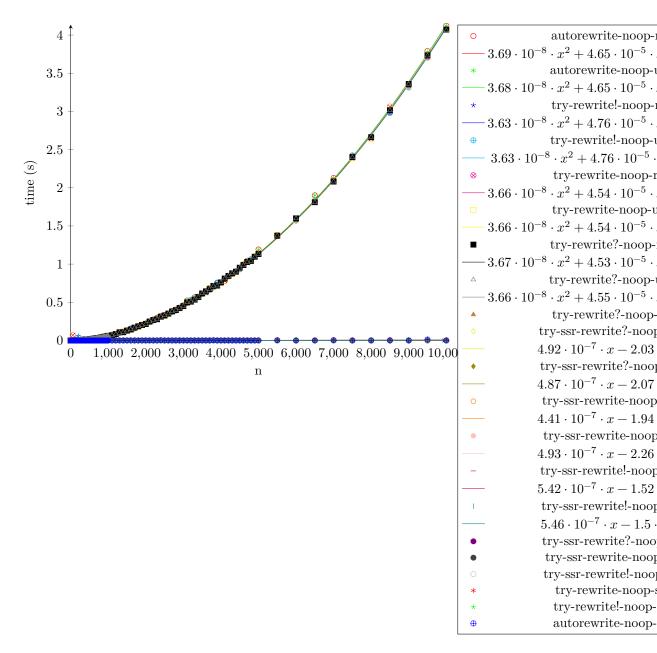
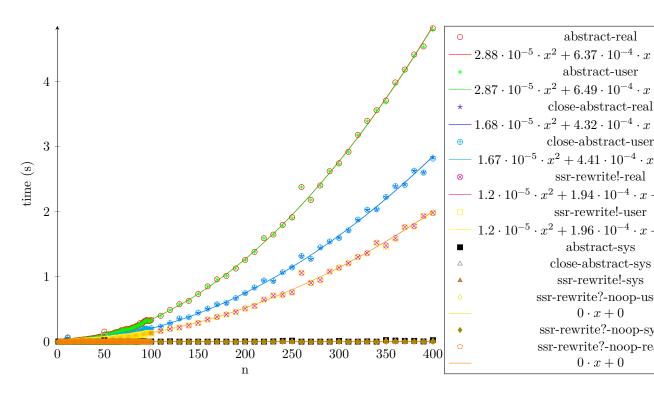


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

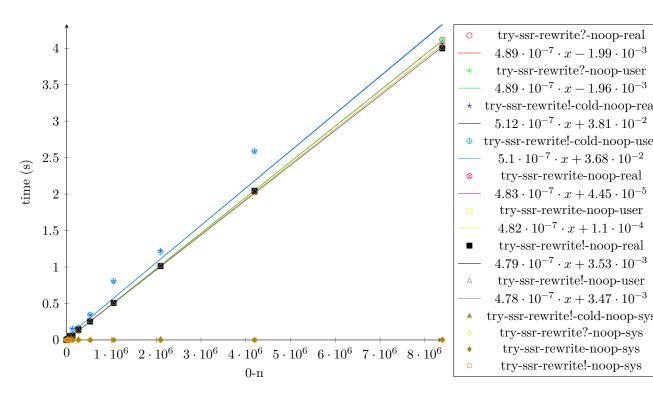


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

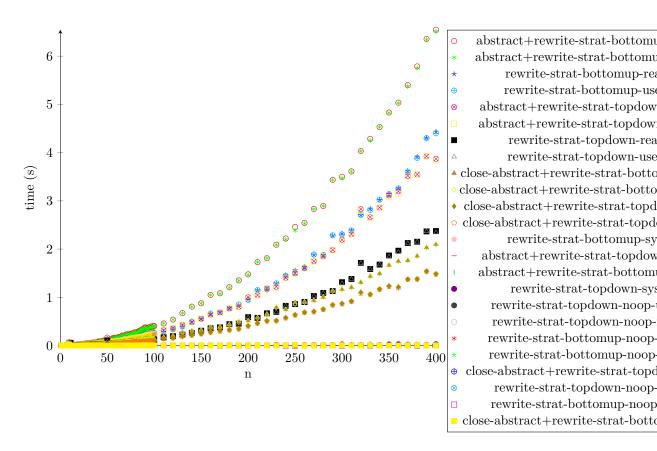


Figure 10: timing-rewrite-repeated-app-rewrite-strat

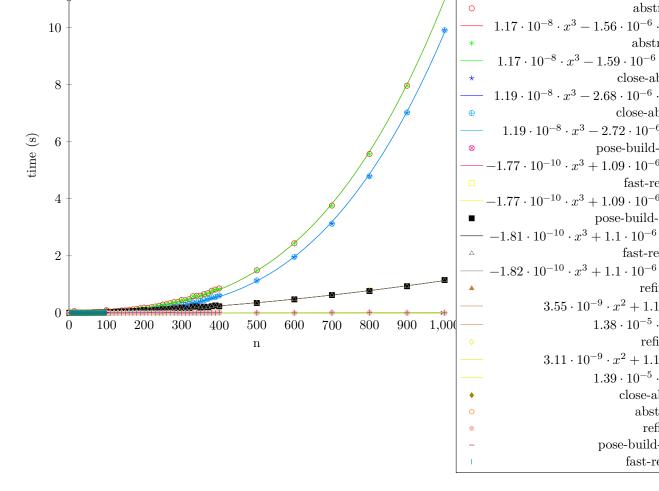
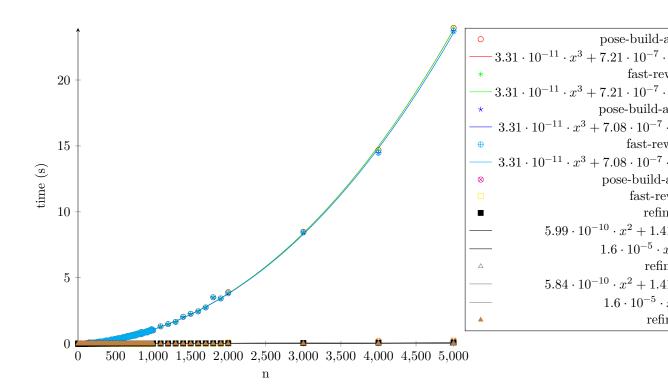


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

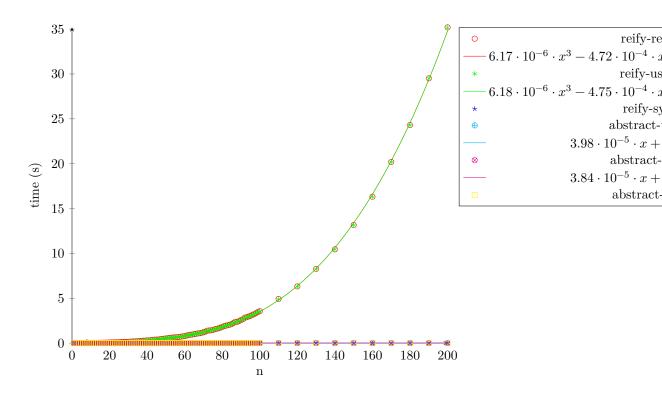


Figure 13: timing-typeclass-reification-let-in-HOAS

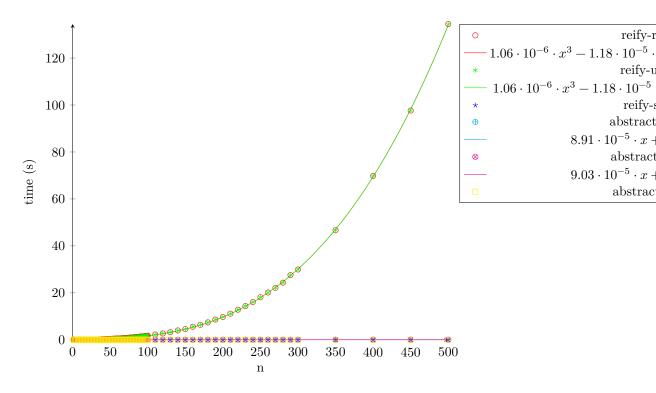
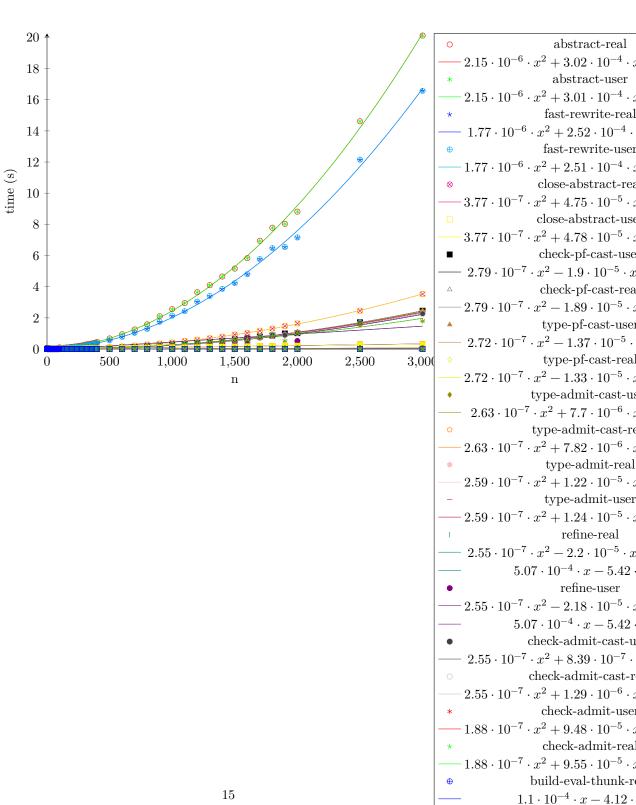


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.15 \cdot 10^{-6} \cdot x^2 + 3.01 \cdot 10^{-4} \cdot x^2$ $1.77 \cdot 10^{-6} \cdot x^2 + 2.52 \cdot 10^{-4}$ $1.77 \cdot 10^{-6} \cdot x^2 + 2.51 \cdot 10^{-4} \cdot x^2$ $3.77 \cdot 10^{-7} \cdot x^2 + 4.75 \cdot 10^{-5} \cdot x^2$ $3.77 \cdot 10^{-7} \cdot x^2 + 4.78 \cdot 10^{-5} \cdot x^2$ $2.79 \cdot 10^{-7} \cdot x^2 - 1.9 \cdot 10^{-5} \cdot x$ $2.79 \cdot 10^{-7} \cdot x^2 - 1.89 \cdot 10^{-5} \cdot x^2 - 1.89 \cdot 10^{-5} \cdot x^2 + 1.89 \cdot 10^{-5} \cdot x^2$ $2.72 \cdot 10^{-7} \cdot x^2 - 1.37 \cdot 10^{-5}$ $2.72 \cdot 10^{-7} \cdot x^2 - 1.33 \cdot 10^{-5} \cdot x^2$ $2.63 \cdot 10^{-7} \cdot x^2 + 7.7 \cdot 10^{-6} \cdot x^2$ $2.63 \cdot 10^{-7} \cdot x^2 + 7.82 \cdot 10^{-6} \cdot x^2$ $2.59 \cdot 10^{-7} \cdot x^2 + 1.22 \cdot 10^{-5} \cdot x^2$ $2.59 \cdot 10^{-7} \cdot x^2 + 1.24 \cdot 10^{-5} \cdot x^2$ $2.55 \cdot 10^{-7} \cdot x^2 - 2.2 \cdot 10^{-5} \cdot x$ $5.07 \cdot 10^{-4} \cdot x - 5.42 \cdot$ $2.55 \cdot 10^{-7} \cdot x^2 - 2.18 \cdot 10^{-5} \cdot x^2 = 2.18 \cdot 10^{-5} \cdot x^2 + 2.18 \cdot 10^{-5} \cdot x^2 = 2.18 \cdot 10^{-5} \cdot x^2$ $5.07 \cdot 10^{-4} \cdot x - 5.42 \cdot$ $2.55 \cdot 10^{-7} \cdot x^2 + 8.39 \cdot 10^{-7}$ $2.55 \cdot 10^{-7} \cdot x^2 + 1.29 \cdot 10^{-6} \cdot x^2$ $1.88 \cdot 10^{-7} \cdot x^2 + 9.48 \cdot 10^{-5} \cdot x^2$ $1.88 \cdot 10^{-7} \cdot x^2 + 9.55 \cdot 10^{-5} \cdot 10^{-5} \cdot x^2 + 9.55 \cdot 10^{-5} \cdot x^2 + 9.55 \cdot 10^$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-rea

close-abstract-use

check-pf-cast-use

check-pf-cast-rea

type-pf-cast-user

type-pf-cast-real

type-admit-cast-us

type-admit-cast-re

type-admit-real

type-admit-user

refine-real

refine-user

check-admit-cast-u

check-admit-cast-r

check-admit-user

check-admit-real

build-eval-thunk-re

 $1.1 \cdot 10^{-4} \cdot x - 4.12 \cdot$ build-thunk-real $1.09 \cdot 10^{-4} \cdot x - 4.82 \cdot$ build-eval-thunk-u $1.1 \cdot 10^{-4} \cdot x - 5.91 \cdot$ build-thunk-user $1.09 \cdot 10^{-4} \cdot x - 6.45 \cdot$