

Figure 1: timing-pattern

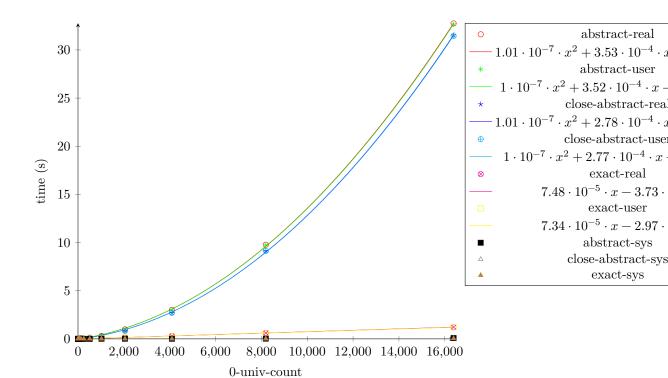


Figure 2: timing-n-polymorphic-universes param-1-n 0

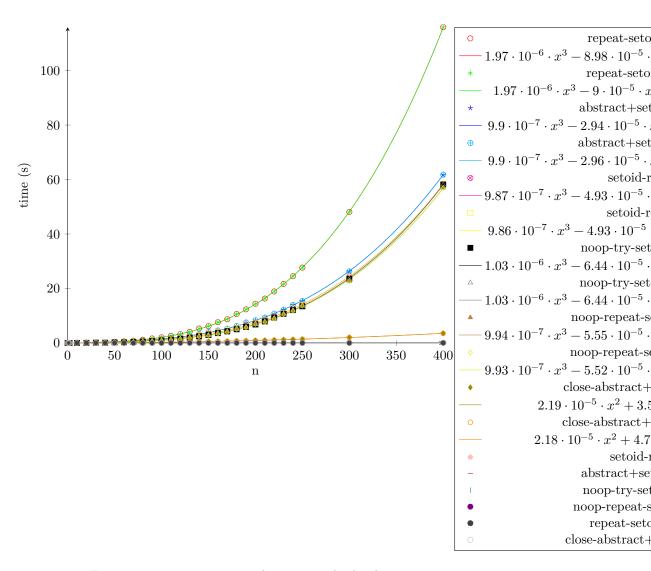


Figure 3: timing-repeat-setoid-rewrite-under-binders

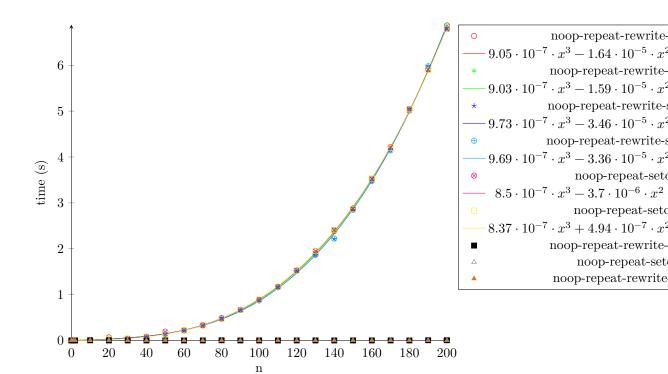


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

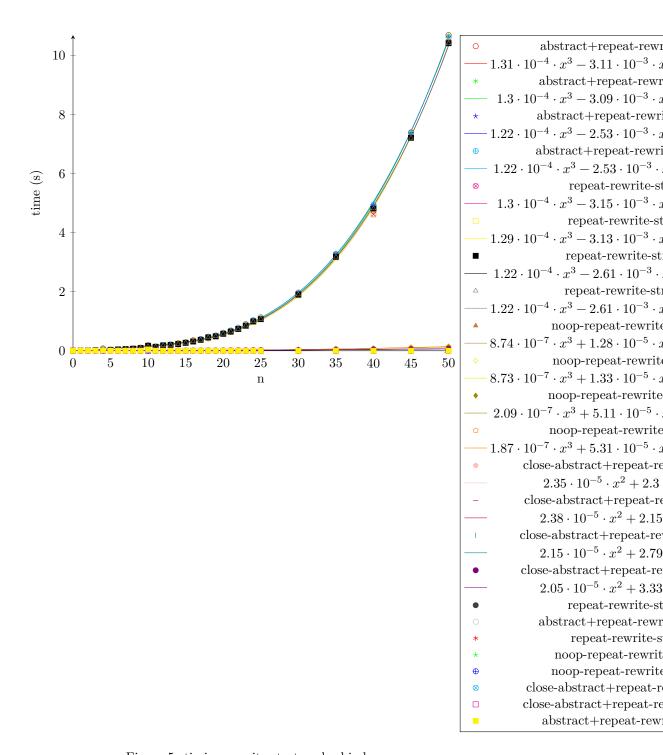
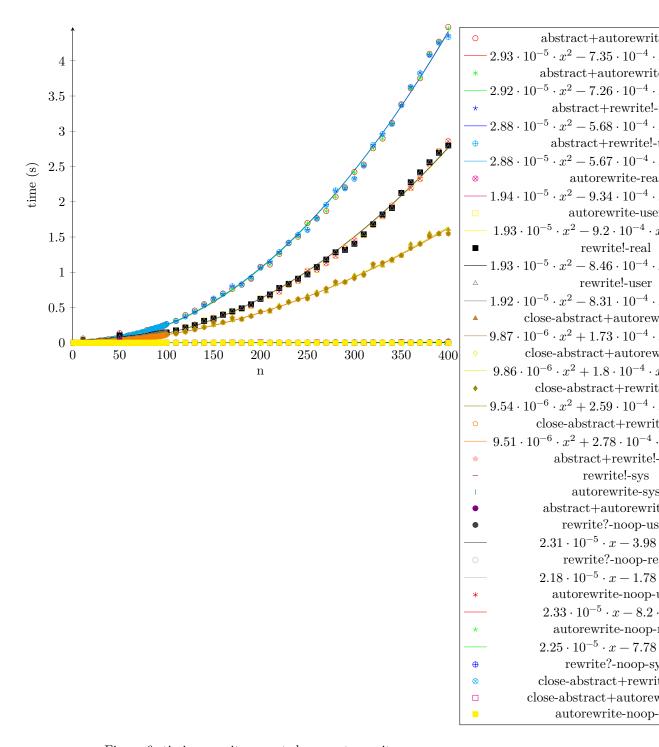


Figure 5: timing-rewrite-strat-under-binders



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

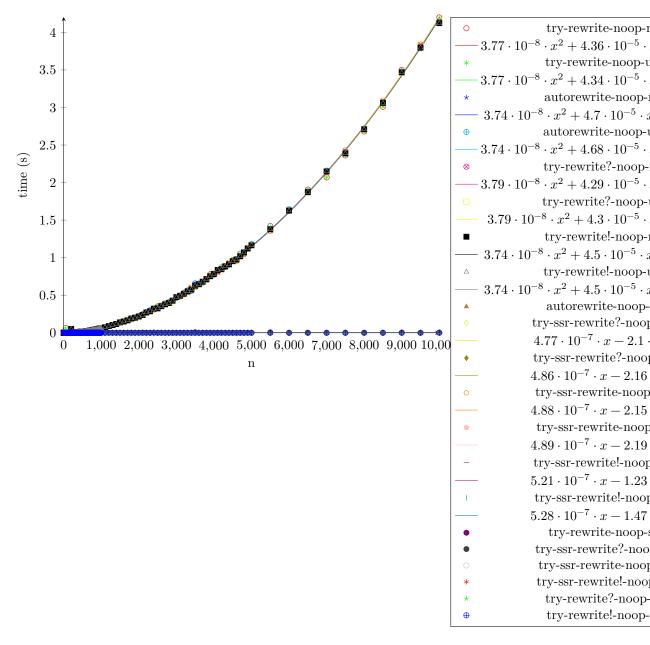


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

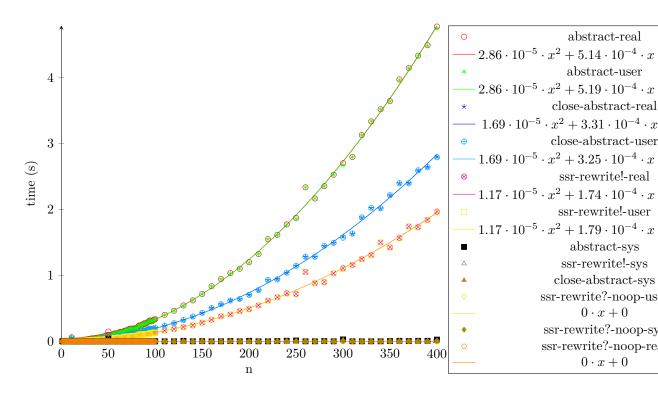


Figure 8: timing-rewrite-repeated-app-ssrrewrite

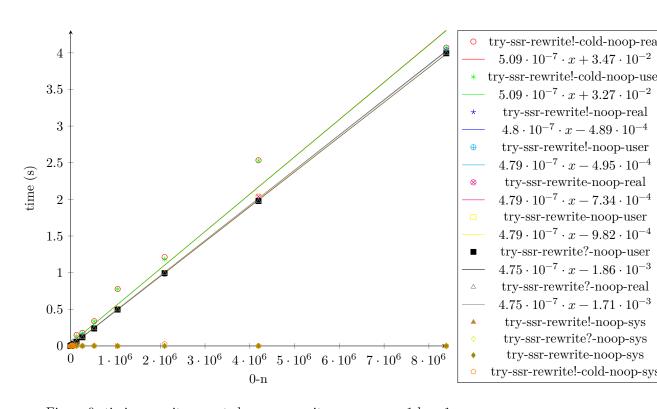


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

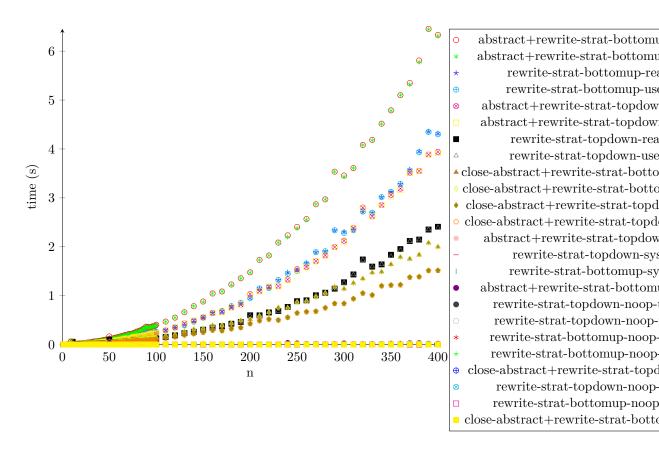


Figure 10: timing-rewrite-repeated-app-rewrite-strat

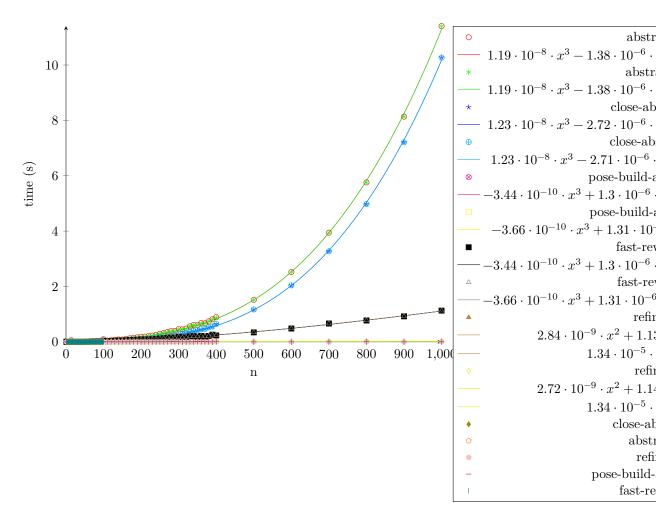
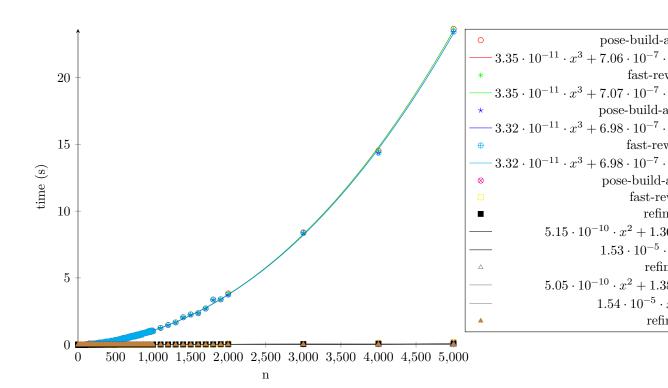
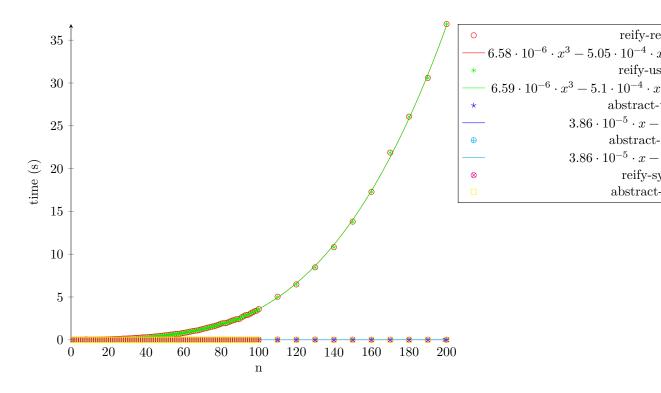


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

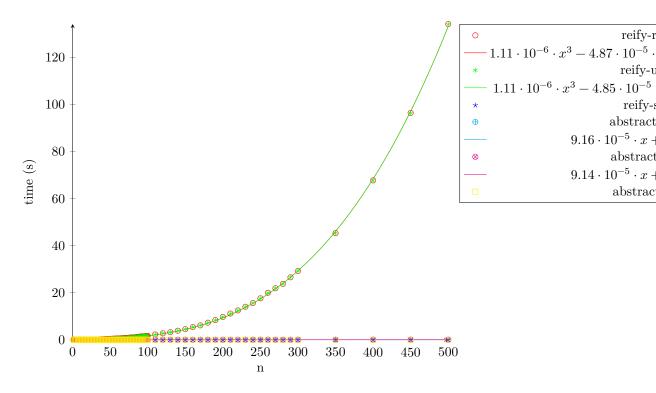
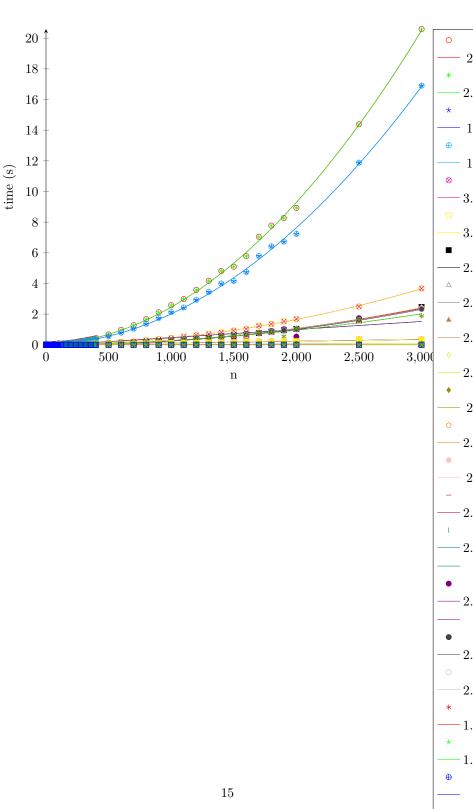


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.19 \cdot 10^{-6} \cdot x^2 + 2.64 \cdot 10^{-4}$ $2.19 \cdot 10^{-6} \cdot x^2 + 2.65 \cdot 10^{-4} \cdot x^2$ $1.8 \cdot 10^{-6} \cdot x^2 + 2.16 \cdot 10^{-4} \cdot x$ $1.8 \cdot 10^{-6} \cdot x^2 + 2.15 \cdot 10^{-4} \cdot x$ $3.91 \cdot 10^{-7} \cdot x^2 + 4.58 \cdot 10^{-5} \cdot x^2$ $3.89 \cdot 10^{-7} \cdot x^2 + 4.82 \cdot 10^{-5} \cdot x^2$ $2.71 \cdot 10^{-7} \cdot x^2 - 1.15 \cdot 10^{-5} \cdot x^2$ $2.71 \cdot 10^{-7} \cdot x^2 - 1.11 \cdot 10^{-5} \cdot x^2$ $2.68 \cdot 10^{-7} \cdot x^2 - 9.72 \cdot 10^{-6} \cdot x^2$ $2.68 \cdot 10^{-7} \cdot x^2 - 9.21 \cdot 10^{-6} \cdot x^2$ $2.72 \cdot 10^{-7} \cdot x^2 - 1.55 \cdot 10^{-5} \cdot$ $2.73 \cdot 10^{-7} \cdot x^2 - 1.54 \cdot 10^{-5} \cdot x^2$ $2.73 \cdot 10^{-7} \cdot x^2 - 2.78 \cdot 10^{-5} \cdot$ $2.72 \cdot 10^{-7} \cdot x^2 - 2.59 \cdot 10^{-5} \cdot x^2 = 2.59 \cdot 10^{-5} \cdot x^2 + 2.59 \cdot 10^{-5} \cdot x^2$ $2.64 \cdot 10^{-7} \cdot x^2 - 2.23 \cdot 10^{-5} \cdot x^2$ $5.26 \cdot 10^{-4} \cdot x - 5.63 \cdot$ $2.64 \cdot 10^{-7} \cdot x^2 - 2.22 \cdot 10^{-5} \cdot x^2 = 2.22 \cdot 10^{-5} \cdot x^2 + 2.22 \cdot 10^{-5} \cdot x^2$ $5.26 \cdot 10^{-4} \cdot x - 5.63 \cdot$ $2.52 \cdot 10^{-7} \cdot x^2 + 1.92 \cdot 10^{-5} \cdot x^2$ $2.52 \cdot 10^{-7} \cdot x^2 + 2.01 \cdot 10^{-5} \cdot x^2$ $1.97 \cdot 10^{-7} \cdot x^2 + 8.68 \cdot 10^{-5} \cdot x^2 + 8.68 \cdot 10^{-5}$ $1.97 \cdot 10^{-7} \cdot x^2 + 8.68 \cdot 10^{-5} \cdot x^2$ $1.17 \cdot 10^{-4} \cdot x - 9.1 \cdot$ $1.17 \cdot 10^{-4} \cdot x - 7.33 \cdot$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-rea

close-abstract-use

type-admit-cast-us

type-admit-cast-re

type-admit-real

type-admit-user

type-pf-cast-user

type-pf-cast-real

check-admit-cast-r

check-admit-cast-u

refine-user

refine-real

check-pf-cast-use

check-pf-cast-rea

check-admit-user

check-admit-real

build-eval-thunk-u

build-eval-thunk-re

build-thunk-user $1.16 \cdot 10^{-4} \cdot x - 1.01$ build-thunk-real $1.16 \cdot 10^{-4} \cdot x - 8.21 \cdot$