

Figure 1: timing-pattern

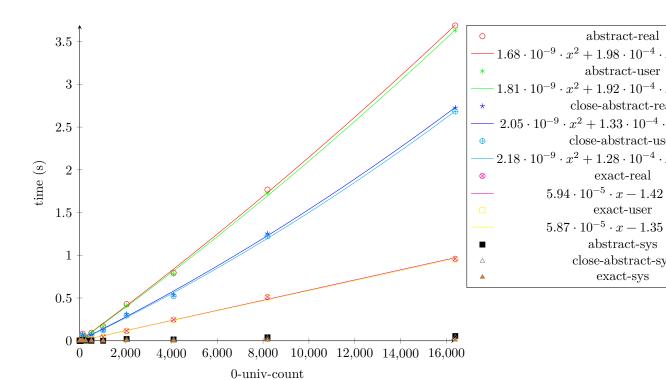


Figure 2: timing-n-polymorphic-universes param-1-n 0

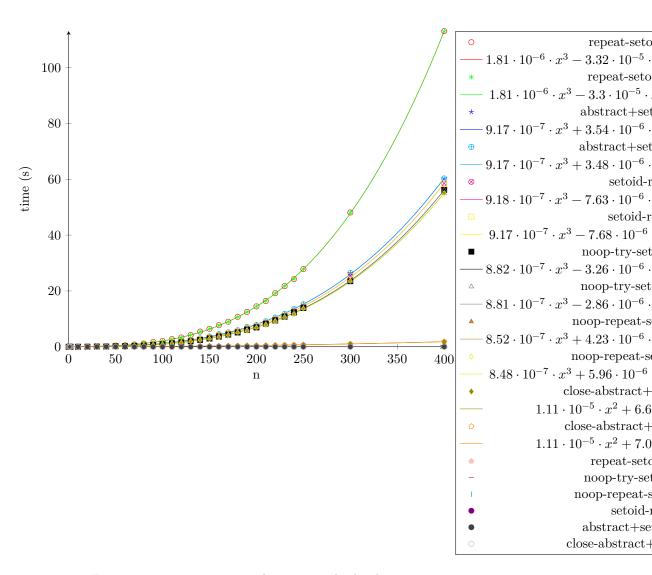


Figure 3: timing-repeat-setoid-rewrite-under-binders

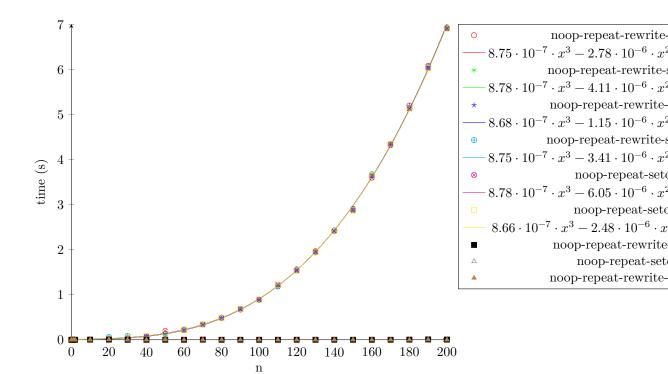


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

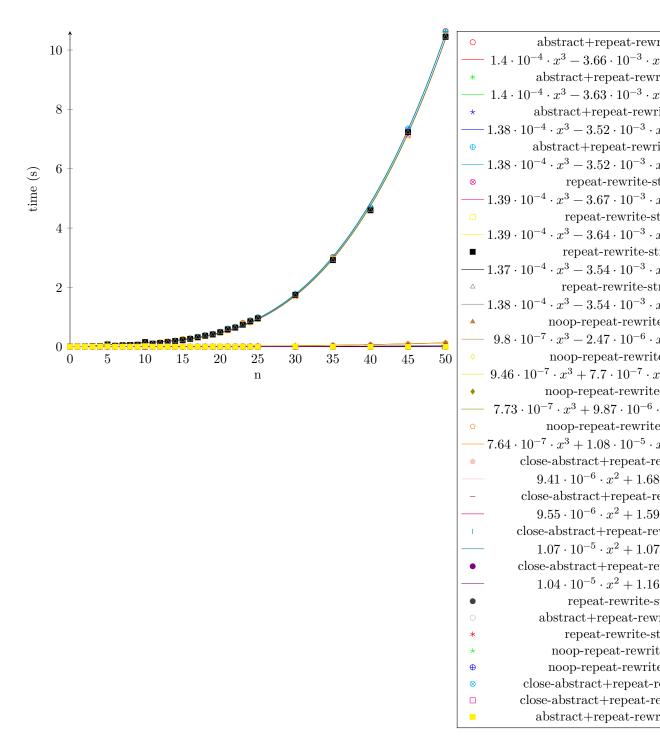


Figure 5: timing-rewrite-strat-under-binders

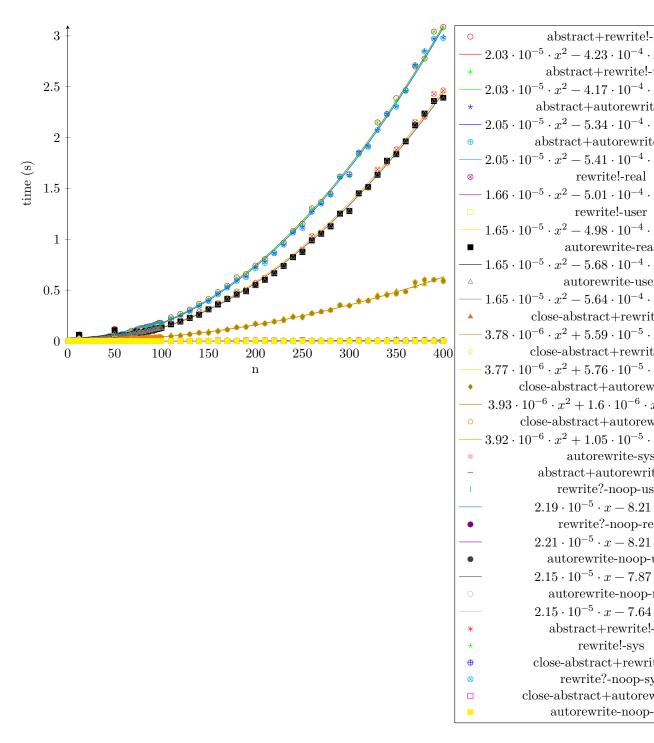


Figure 6: timing-rewrite-repeated-app-autorewrite

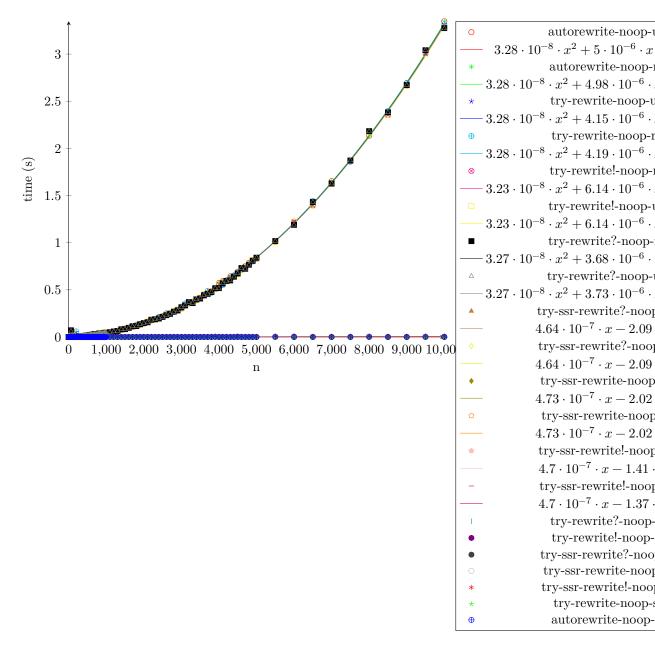


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

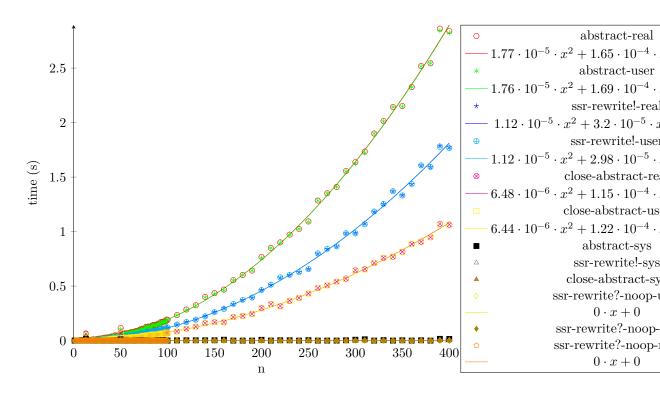


Figure 8: timing-rewrite-repeated-app-ssrrewrite

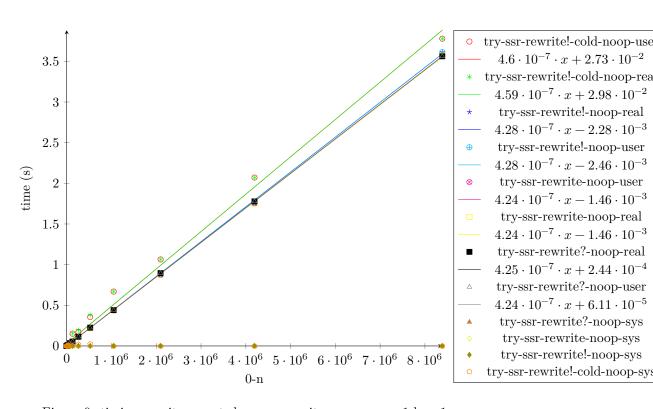


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

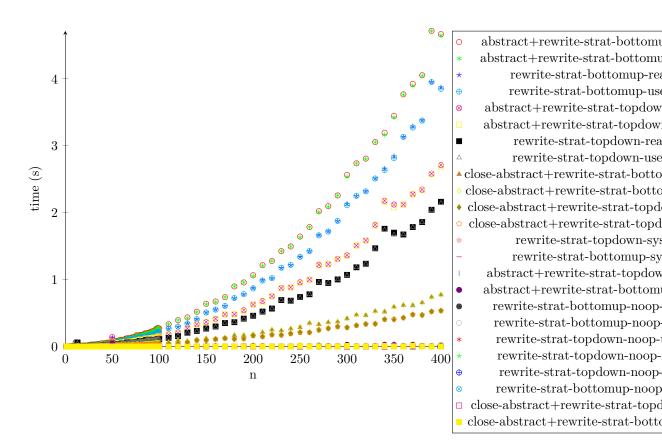


Figure 10: timing-rewrite-repeated-app-rewrite-strat

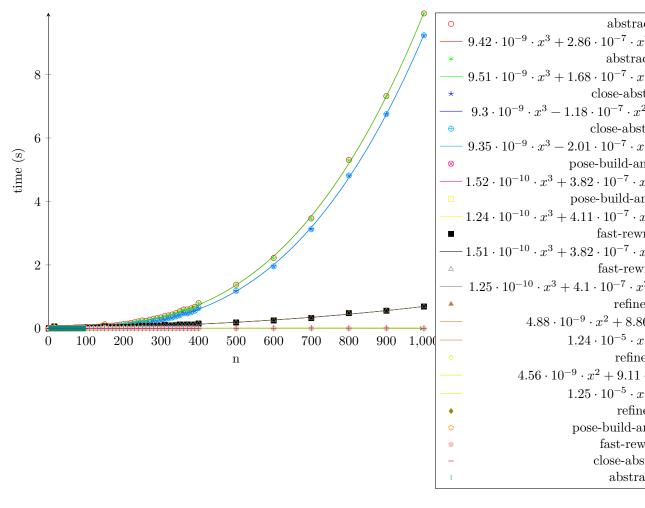
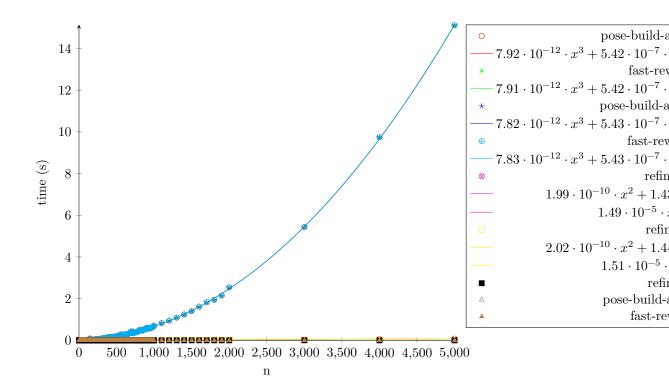
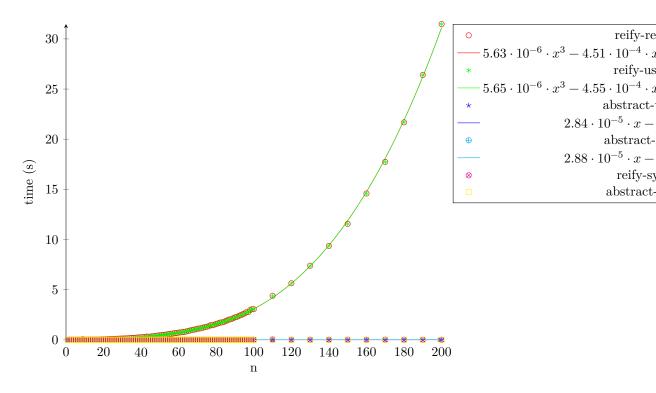


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

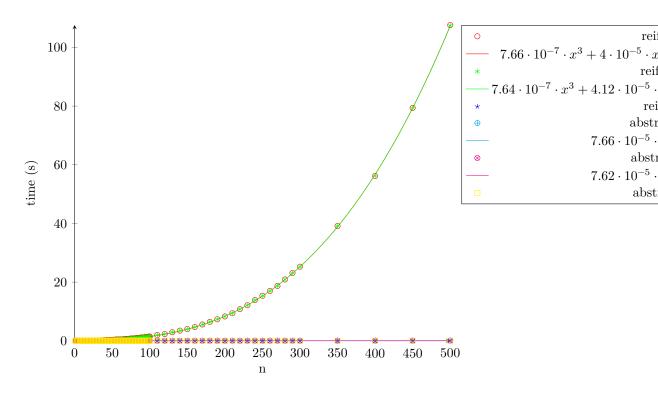
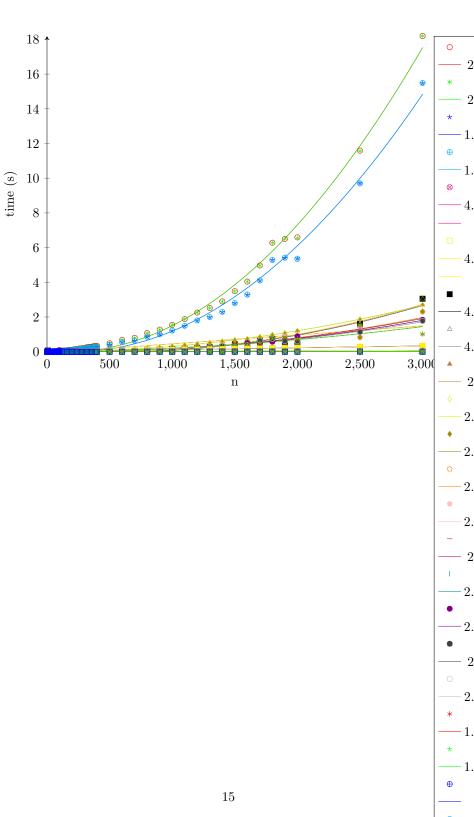


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.2 \cdot 10^{-6} \cdot x^2 - 7.95 \cdot 10^{-4} \cdot x$ $2.2 \cdot 10^{-6} \cdot x^2 - 7.99 \cdot 10^{-4} \cdot x$ $-1.91 \cdot 10^{-6} \cdot x^2 - 8.12 \cdot 10^{-4} \cdot x^2$ $1.91 \cdot 10^{-6} \cdot x^2 - 8.14 \cdot 10^{-4} \cdot x^2$ $4.15 \cdot 10^{-7} \cdot x^2 - 3.46 \cdot 10^{-4} \cdot x^2 + 3.46 \cdot 10^{-4} \cdot x^2$ $4.15 \cdot 10^{-7} \cdot x^2 - 3.46 \cdot 10^{-4} \cdot x^2$ $4.16 \cdot 10^{-7} \cdot x^2 - 3.69 \cdot 10^{-4} \cdot x^2$ $4.16 \cdot 10^{-7} \cdot x^2 - 3.68 \cdot 10^{-4} \cdot x^2$ $2.94 \cdot 10^{-7} \cdot x^2 + 1.47 \cdot 10^{-5}$ $2.94 \cdot 10^{-7} \cdot x^2 + 1.36 \cdot 10^{-5} \cdot x^2$ $2.61 \cdot 10^{-7} \cdot x^2 - 1.29 \cdot 10^{-4} \cdot x^2$ $2.61 \cdot 10^{-7} \cdot x^2 - 1.29 \cdot 10^{-4} \cdot x^2$ $2.43 \cdot 10^{-7} \cdot x^2 - 9.23 \cdot 10^{-5} \cdot x^2$ $2.43 \cdot 10^{-7} \cdot x^2 - 9.21 \cdot 10^{-5}$ $2.27 \cdot 10^{-7} \cdot x^2 - 8.08 \cdot 10^{-5} \cdot x^2 = 0.08 \cdot 10^{-5} \cdot x^2 + 0.08 \cdot 10^{-5} \cdot x^2$ $2.27 \cdot 10^{-7} \cdot x^2 - 8.02 \cdot 10^{-5} \cdot x^2$ $2.12 \cdot 10^{-7} \cdot x^2 - 6.41 \cdot 10^{-5}$ $2.12 \cdot 10^{-7} \cdot x^2 - 6.35 \cdot 10^{-5} \cdot x^2$ $1.34 \cdot 10^{-7} \cdot x^2 + 8.41 \cdot 10^{-5} \cdot x^2$ $1.33 \cdot 10^{-7} \cdot x^2 + 8.45 \cdot 10^{-5} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

refine-user

 $5.17 \cdot 10^{-4} \cdot x - 6.36$ refine-real

 $5.17 \cdot 10^{-4} \cdot x - 6.36$

check-admit-cast-u

check-admit-cast-re

close-abstract-rea

close-abstract-use

type-admit-cast-us

type-admit-cast-re

check-admit-real

check-admit-user

type-admit-user

type-admit-real

check-pf-cast-use

check-pf-cast-rea

type-pf-cast-user

type-pf-cast-real

build-eval-thunk-u

 $1.12 \cdot 10^{-4} \cdot x - 8.26 \cdot$ build-eval-thunk-re $1.13 \cdot 10^{-4} \cdot x - 7.01$ build-thunk-user $1.11 \cdot 10^{-4} \cdot x - 9.2$ build-thunk-real $1.12 \cdot 10^{-4} \cdot x - 7.71 \cdot$