

Figure 1: timing-pattern

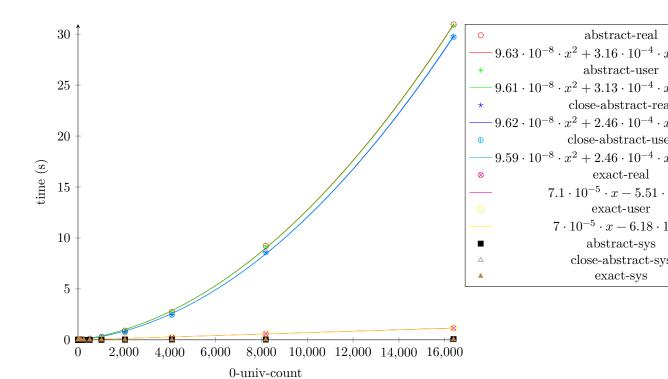
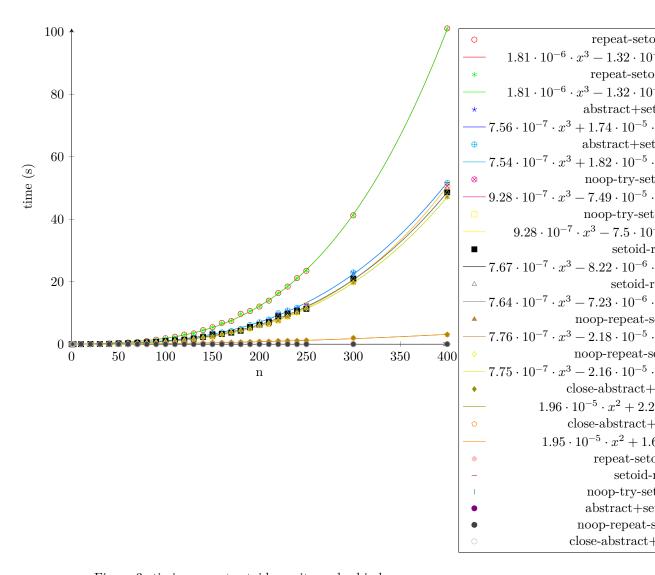
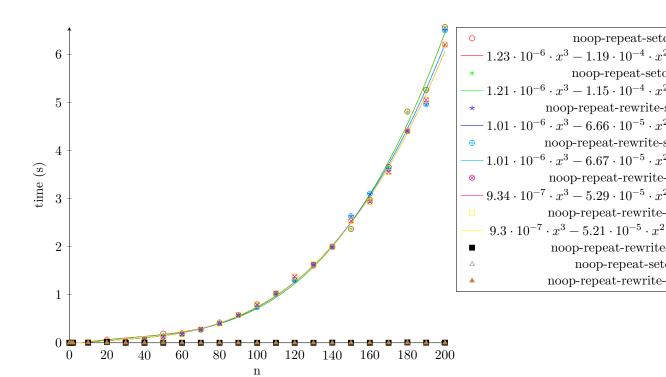


Figure 2: timing-n-polymorphic-universes param-1-n 0



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



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

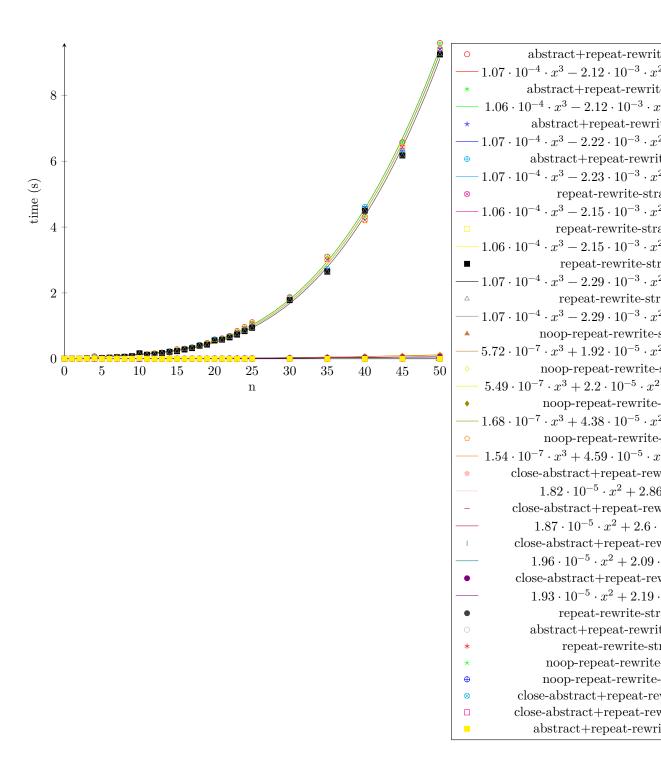
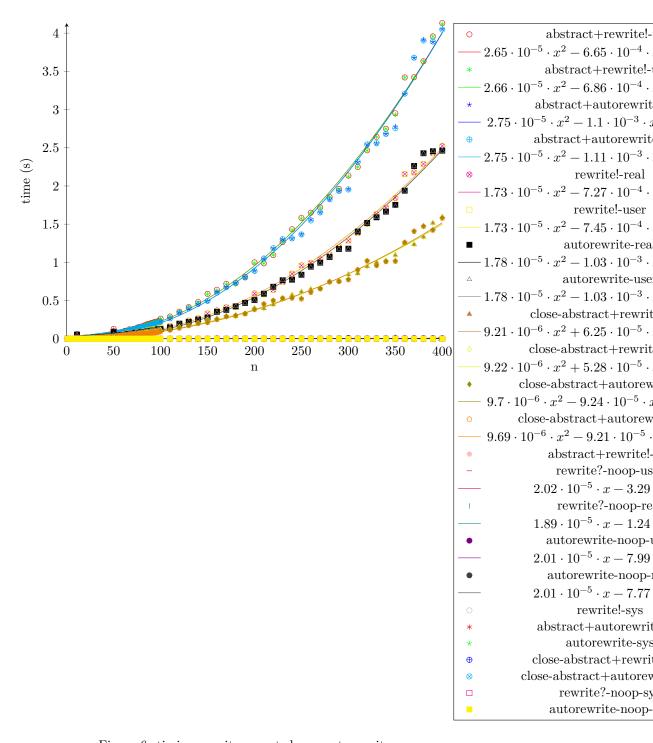


Figure 5: timing-rewrite-strat-under-binders



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

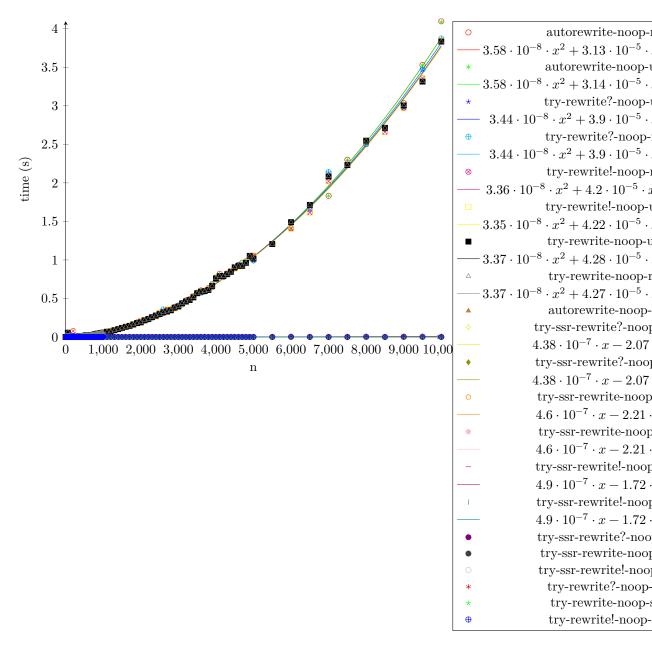
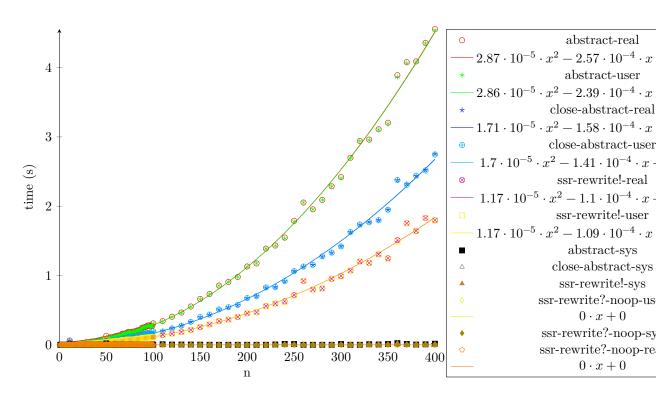


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

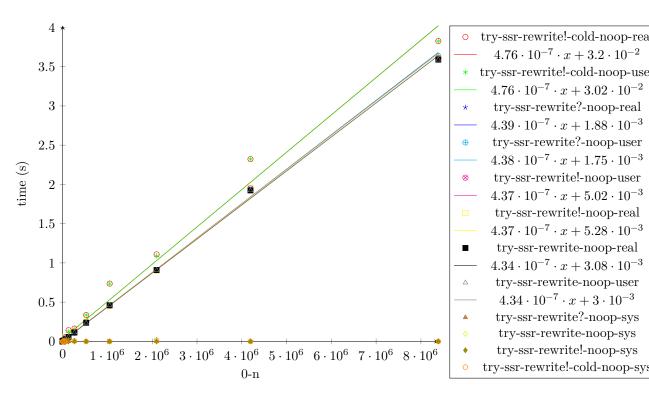


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\,1\,$

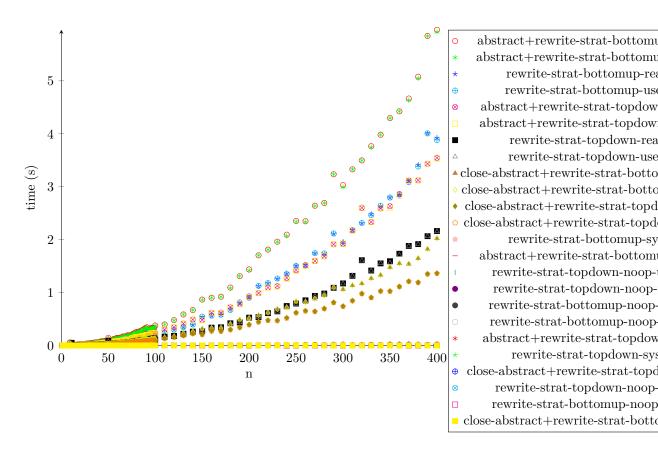


Figure 10: timing-rewrite-repeated-app-rewrite-strat

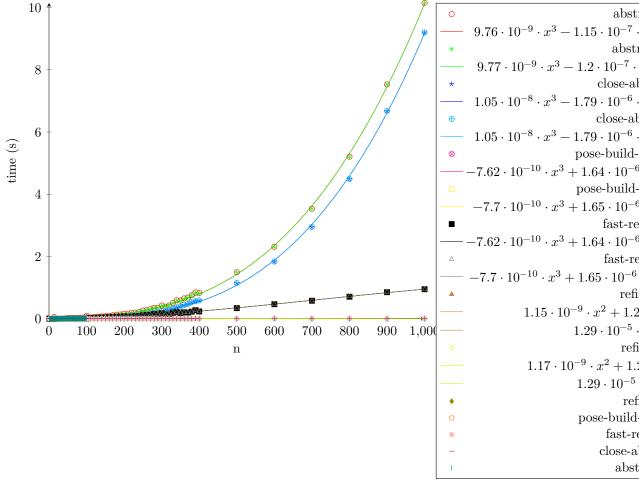
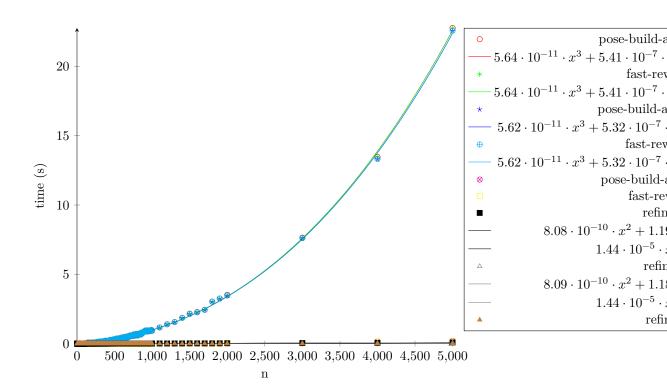
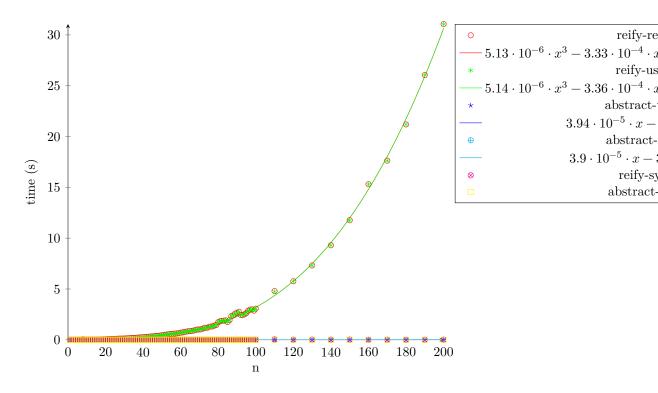


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

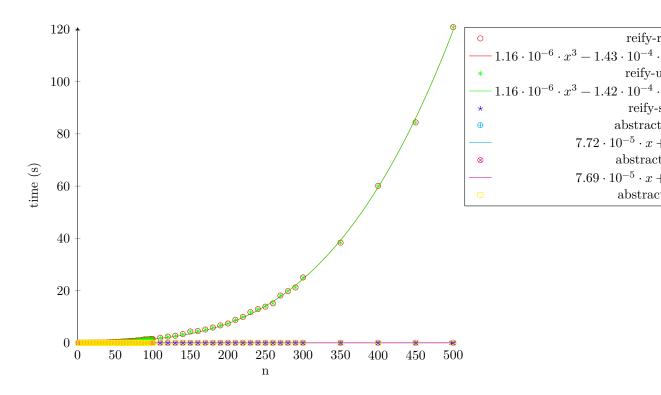
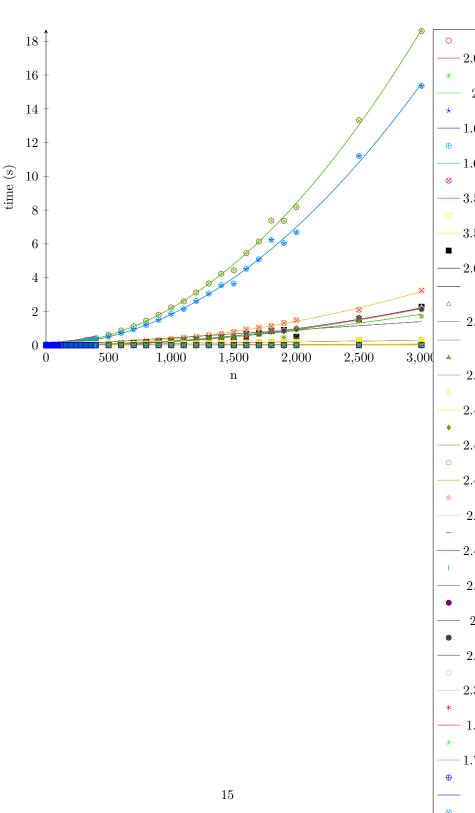


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.02 \cdot 10^{-6} \cdot x^2 + 1.56 \cdot 10^{-4} \cdot x^2$ $2.02 \cdot 10^{-6} \cdot x^2 + 1.53 \cdot 10^{-4}$ $1.67 \cdot 10^{-6} \cdot x^2 + 1.46 \cdot 10^{-4} \cdot x^2$ $1.67 \cdot 10^{-6} \cdot x^2 + 1.44 \cdot 10^{-4} \cdot x^2$ $3.51 \cdot 10^{-7} \cdot x^2 + 7.46 \cdot 10^{-6} \cdot x^2$ $3.51 \cdot 10^{-7} \cdot x^2 + 7.67 \cdot 10^{-6} \cdot x^2$ $2.63 \cdot 10^{-7} \cdot x^2 - 6.37 \cdot 10^{-5} \cdot x^2 = 6.37 \cdot 10^{-5} \cdot x^2 + 6.37 \cdot 10^{-5} \cdot 10^$ $2.63 \cdot 10^{-7} \cdot x^2 - 6.27 \cdot 10^{-5}$ $2.49 \cdot 10^{-7} \cdot x^2 - 8.15 \cdot 10^{-6} \cdot$ $2.49 \cdot 10^{-7} \cdot x^2 - 7.18 \cdot 10^{-6} \cdot x^2$ $2.45\cdot 10^{-7}\cdot x^2 - 2.97\cdot 10^{-6}\cdot x^2 - 2.97\cdot 10^{-6}\cdot x^2 + 2.97\cdot 1$ $2.45 \cdot 10^{-7} \cdot x^2 - 2.76 \cdot 10^{-6} \cdot x^2 = 2.76 \cdot 10^{-6} \cdot x^2 + 2.76 \cdot 10^{-6} \cdot x^2$ $2.48\cdot 10^{-7}\cdot x^2 - 4.72\cdot 10^{-6}\cdot$ $2.48 \cdot 10^{-7} \cdot x^2 - 4.58 \cdot 10^{-6} \cdot x^2$ $2.5 \cdot 10^{-7} \cdot x^2 - 2.53 \cdot 10^{-5} \cdot x$ $2.5 \cdot 10^{-7} \cdot x^2 - 2.5 \cdot 10^{-5} \cdot x$ $2.39 \cdot 10^{-7} \cdot x^2 + 1.2 \cdot 10^{-6} \cdot x$ $2.39 \cdot 10^{-7} \cdot x^2 + 1.22 \cdot 10^{-6} \cdot x^2$

 $1.8 \cdot 10^{-7} \cdot x^2 + 7.64 \cdot 10^{-5} \cdot x$ check-admit-real $1.79 \cdot 10^{-7} \cdot x^2 + 7.69 \cdot 10^{-5} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-use

close-abstract-rea

refine-user

 $4.83 \cdot 10^{-4} \cdot x - 5.27 \cdot$ refine-real

 $4.83 \cdot 10^{-4} \cdot x - 5.27 \cdot$

type-admit-cast-us

type-admit-cast-re

type-pf-cast-user

type-pf-cast-real

check-pf-cast-rea

check-pf-cast-use

check-admit-cast-u

check-admit-cast-r

type-admit-user

type-admit-real

check-admit-user

build-eval-thunk-re $9.86 \cdot 10^{-5} \cdot x - 4.34 \cdot$ build-thunk-real

 $9.79 \cdot 10^{-5} \cdot x - 5.2 \cdot$ build-eval-thunk-us $9.83 \cdot 10^{-5} \cdot x - 5.6 \cdot$

> build-thunk-user $9.75 \cdot 10^{-5} \cdot x - 6.3 \cdot$

> > typo I ugor