

Figure 1: timing-pattern

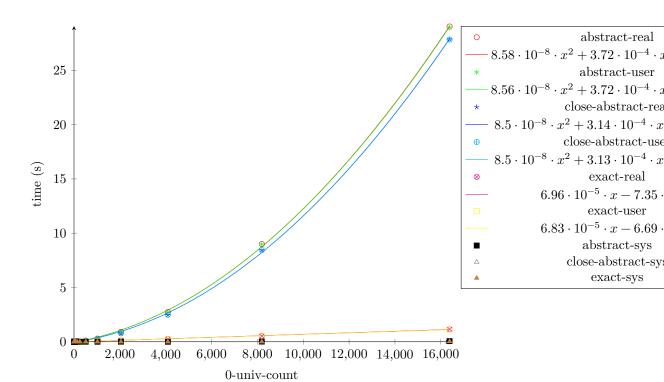


Figure 2: timing-n-polymorphic-universes param-1-n 0

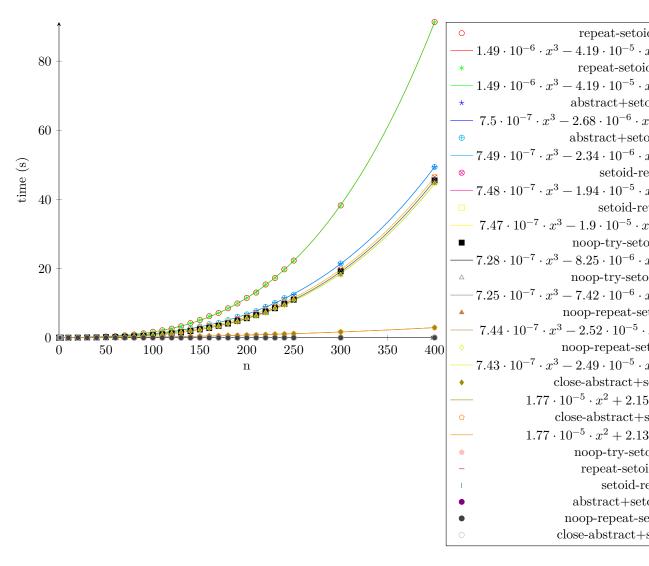
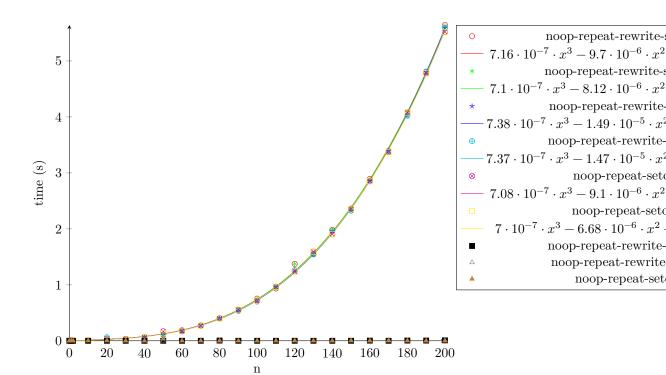


Figure 3: timing-repeat-setoid-rewrite-under-binders



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

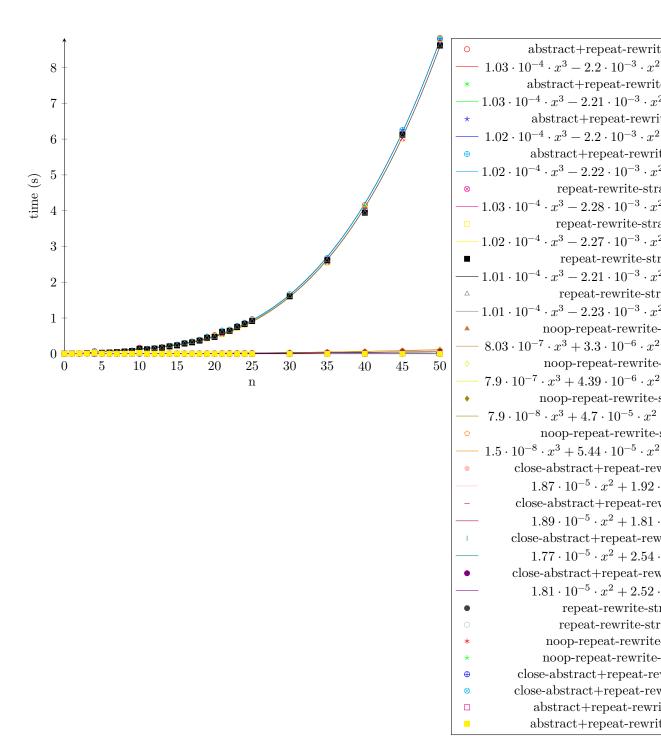
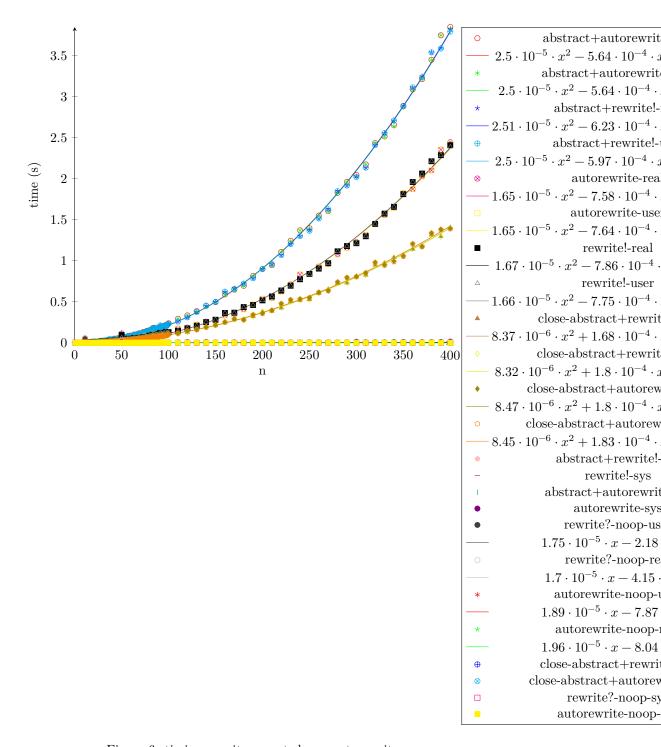


Figure 5: timing-rewrite-strat-under-binders



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

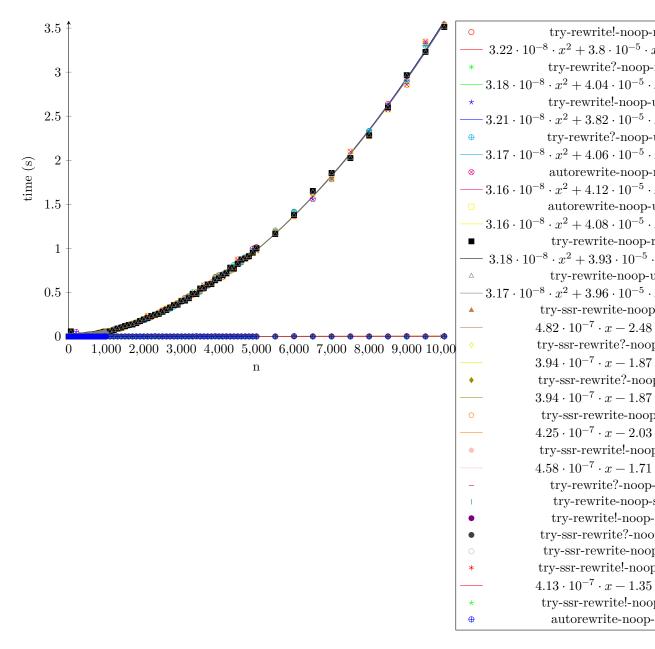


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

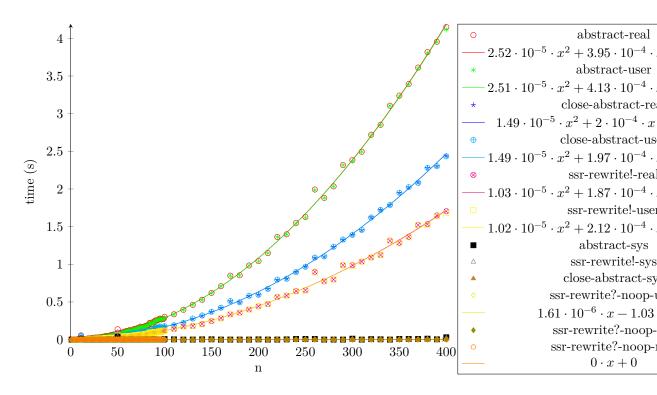


Figure 8: timing-rewrite-repeated-app-ssrrewrite

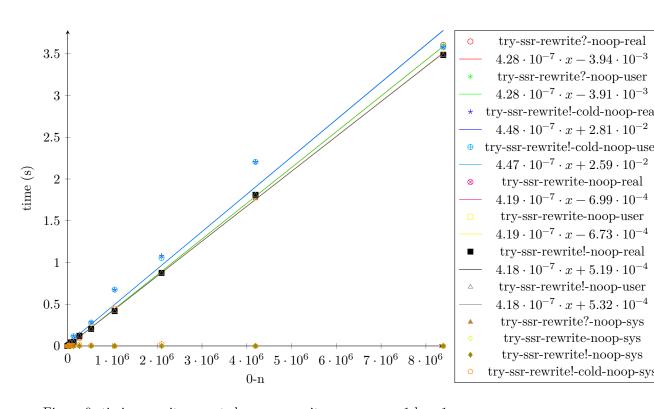


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

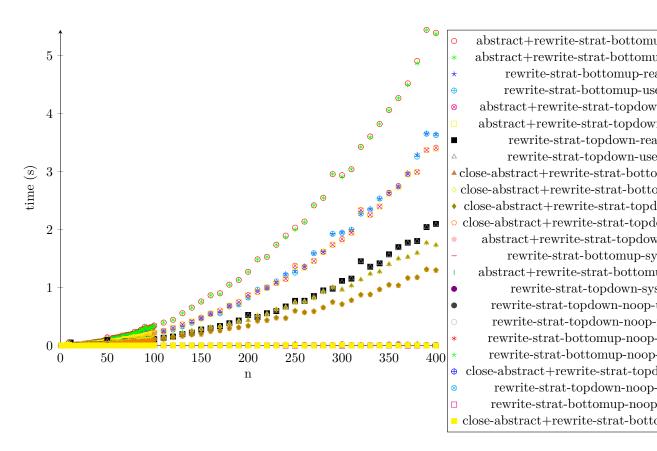


Figure 10: timing-rewrite-repeated-app-rewrite-strat

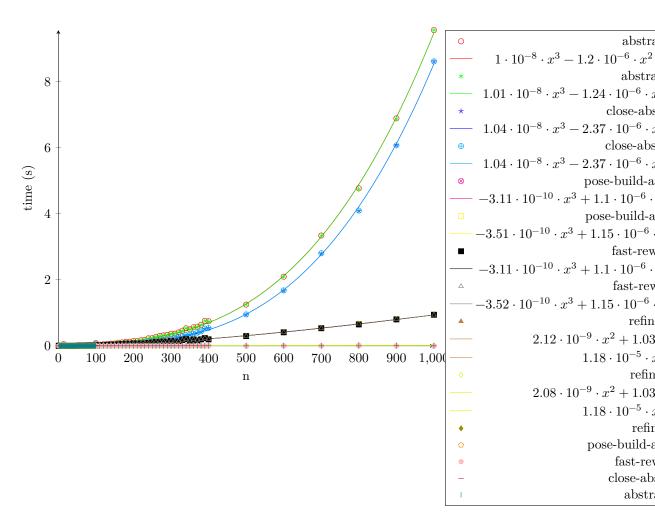
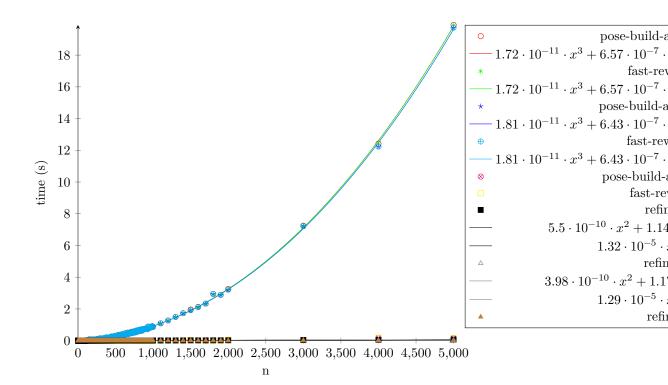
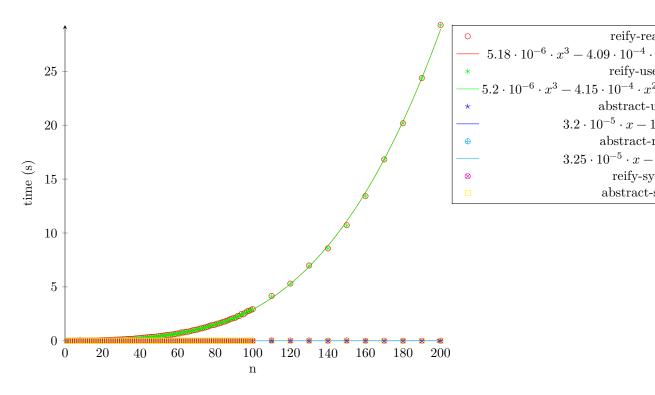


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

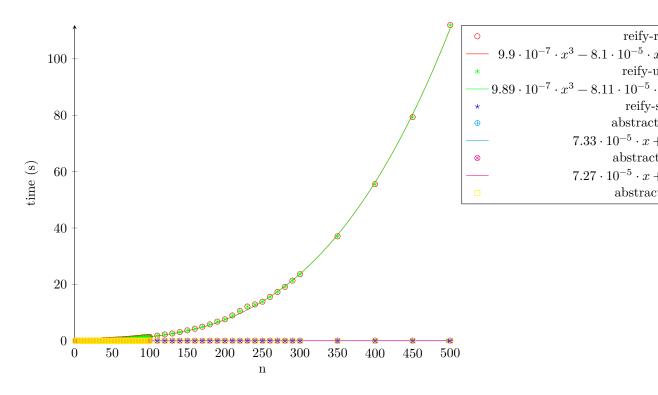
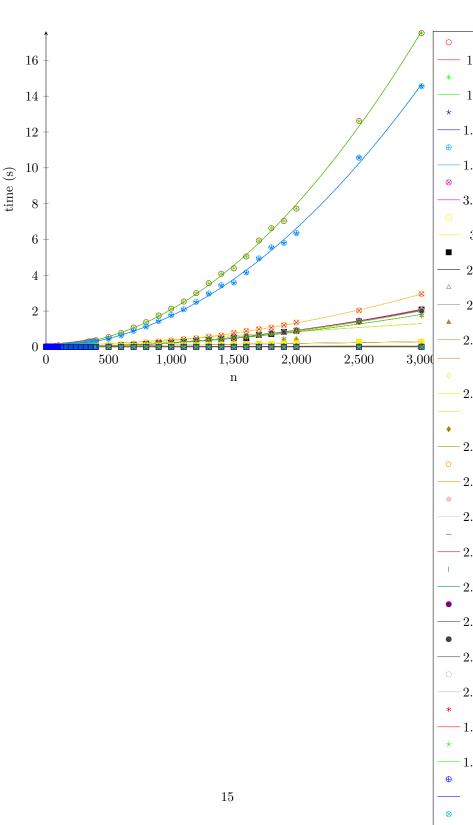


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $1.9 \cdot 10^{-6} \cdot x^2 + 1.89 \cdot 10^{-4} \cdot x$ $1.89 \cdot 10^{-6} \cdot x^2 + 1.9 \cdot 10^{-4} \cdot x$ $1.58 \cdot 10^{-6} \cdot x^2 + 1.52 \cdot 10^{-4} \cdot x^2$ $1.58 \cdot 10^{-6} \cdot x^2 + 1.52 \cdot 10^{-4} \cdot x^2$ $3.16 \cdot 10^{-7} \cdot x^2 + 3.59 \cdot 10^{-5} \cdot x^2$ $3.16 \cdot 10^{-7} \cdot x^2 + 3.6 \cdot 10^{-5} \cdot x^2$ $2.4 \cdot 10^{-7} \cdot x^2 - 2.99 \cdot 10^{-5} \cdot x$ $2.4 \cdot 10^{-7} \cdot x^2 - 2.93 \cdot 10^{-5} \cdot x$ $2.37 \cdot 10^{-7} \cdot x^2 - 4.05 \cdot 10^{-5} \cdot x^2 = 4.05 \cdot 10^{-5} \cdot x^2 + 4.05 \cdot 10^{-5} \cdot x^2 = 4.05 \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot 10^{-5} \cdot$ $4.52 \cdot 10^{-4} \cdot x - 4.92 \cdot$ $2.37 \cdot 10^{-7} \cdot x^2 - 3.99 \cdot 10^{-5} \cdot x^2 = 3.99 \cdot 10^{-5} \cdot x^2 + 3.99 \cdot 10^{-5} \cdot x^2$ $4.52 \cdot 10^{-4} \cdot x - 4.91 \cdot$ $2.34 \cdot 10^{-7} \cdot x^2 - 8.39 \cdot 10^{-6} \cdot x^2$ $2.34 \cdot 10^{-7} \cdot x^2 - 8.34 \cdot 10^{-6} \cdot x^2$ $2.36 \cdot 10^{-7} \cdot x^2 - 4.53 \cdot 10^{-6} \cdot x^2$ $2.36 \cdot 10^{-7} \cdot x^2 - 4.62 \cdot 10^{-6} \cdot x^2$ $2.23 \cdot 10^{-7} \cdot x^2 + 1.31 \cdot 10^{-5} \cdot x^2$ $2.23 \cdot 10^{-7} \cdot x^2 + 1.38 \cdot 10^{-5} \cdot x^2$ $2.17 \cdot 10^{-7} \cdot x^2 + 2.31 \cdot 10^{-5} \cdot x^2$ $2.17 \cdot 10^{-7} \cdot x^2 + 2.27 \cdot 10^{-5} \cdot x^2$ $1.89 \cdot 10^{-7} \cdot x^2 + 4.17 \cdot 10^{-5} \cdot x^2$ $1.89 \cdot 10^{-7} \cdot x^2 + 4.17 \cdot 10^{-5} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-use

close-abstract-rea

check-admit-cast-u

check-admit-cast-r

refine-user

 ${\it refine-real}$

type-admit-real

type-admit-user

type-pf-cast-user

type-pf-cast-real

type-admit-cast-re

type-admit-cast-us

check-pf-cast-use

check-pf-cast-rea

check-admit-user

check-admit-real

 $9.54 \cdot 10^{-5} \cdot x - 9.58 \cdot$ chock Lucor