

Figure 1: timing-pattern

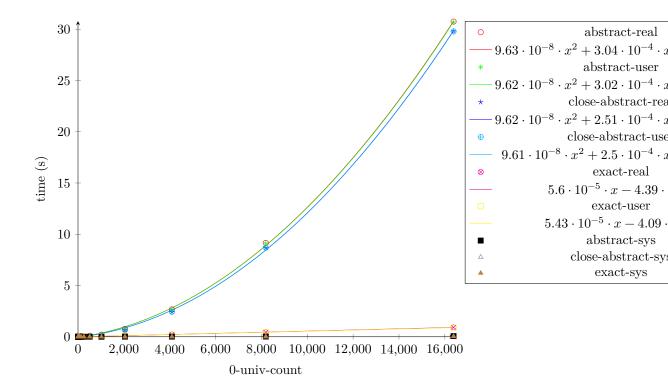


Figure 2: timing-n-polymorphic-universes param-1-n 0

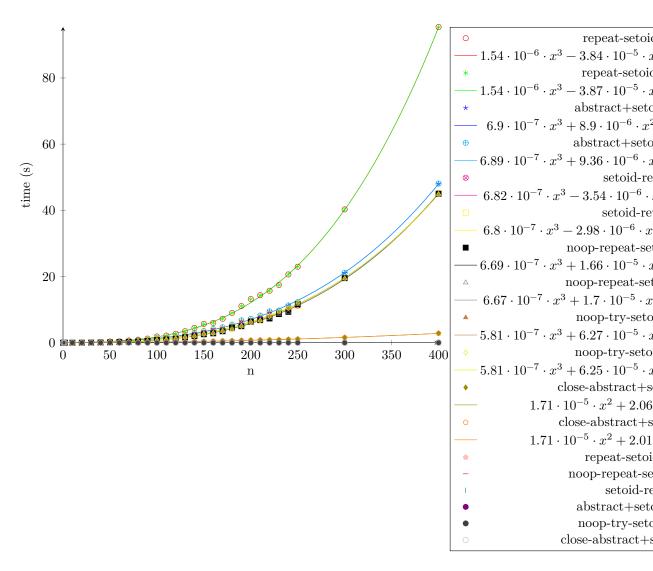
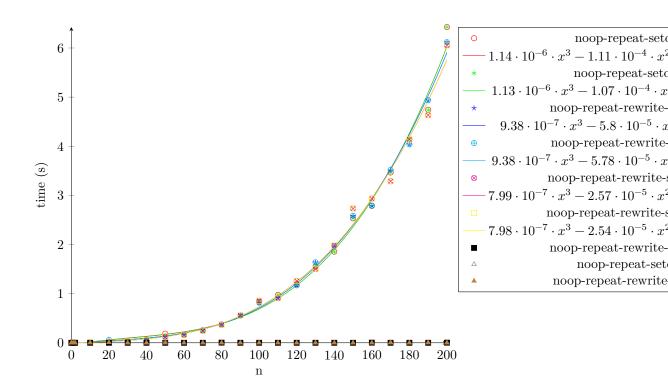


Figure 3: timing-repeat-setoid-rewrite-under-binders



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

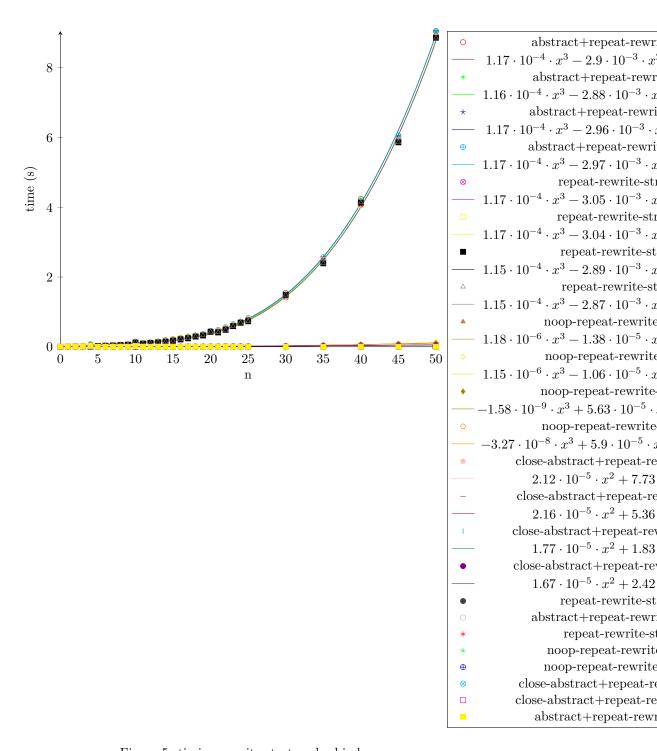


Figure 5: timing-rewrite-strat-under-binders

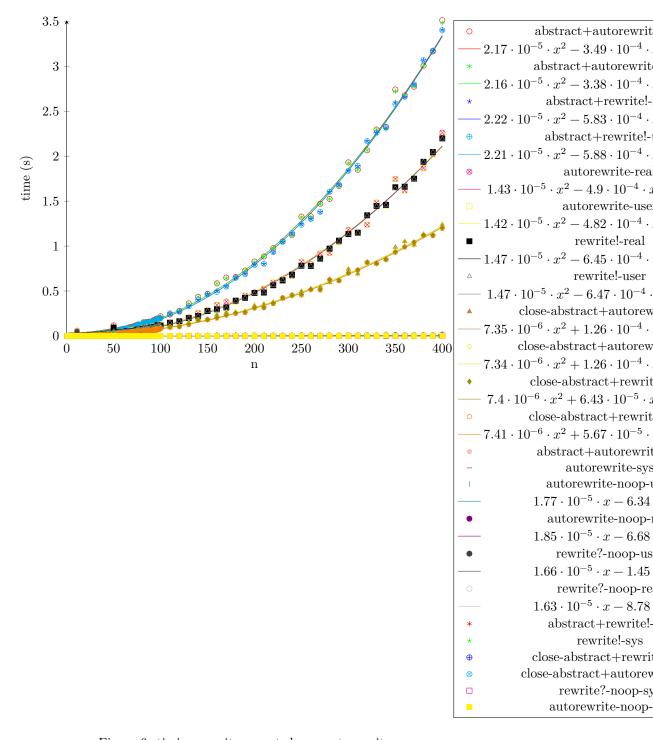


Figure 6: timing-rewrite-repeated-app-autorewrite

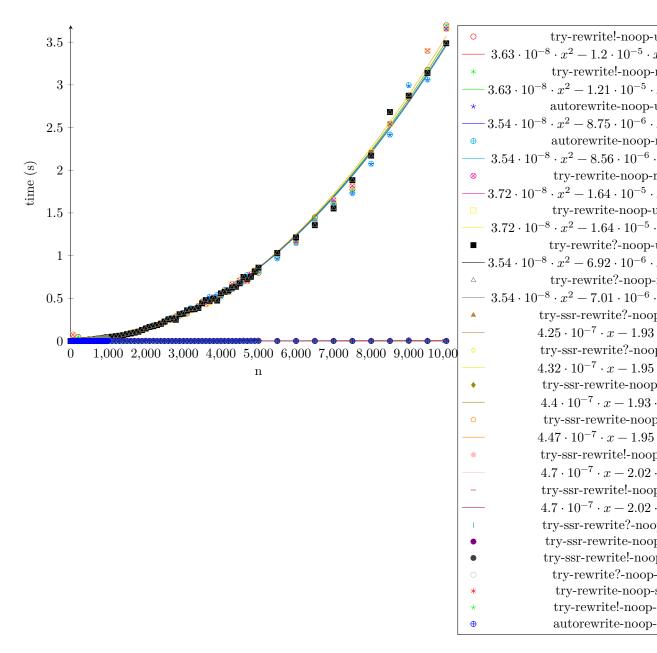


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

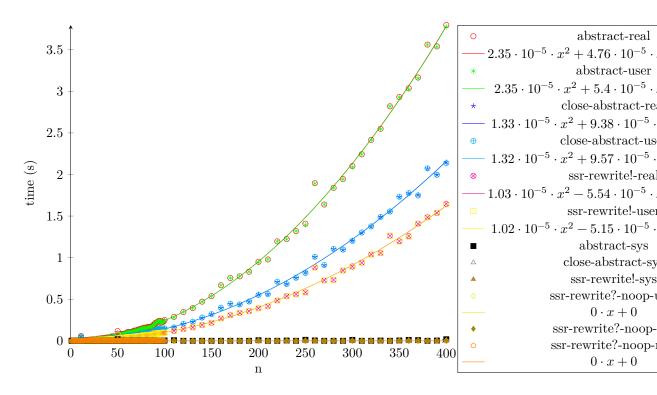


Figure 8: timing-rewrite-repeated-app-ssrrewrite

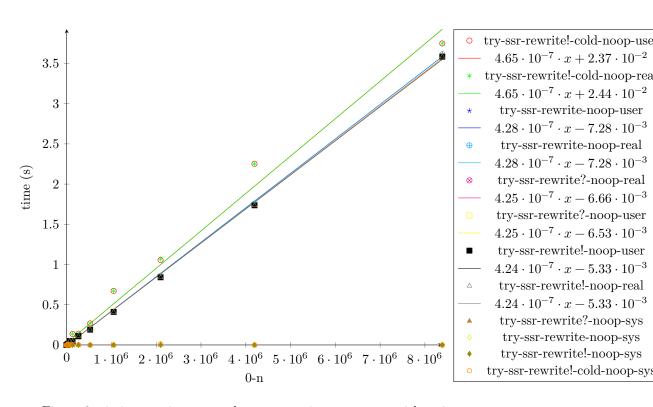


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

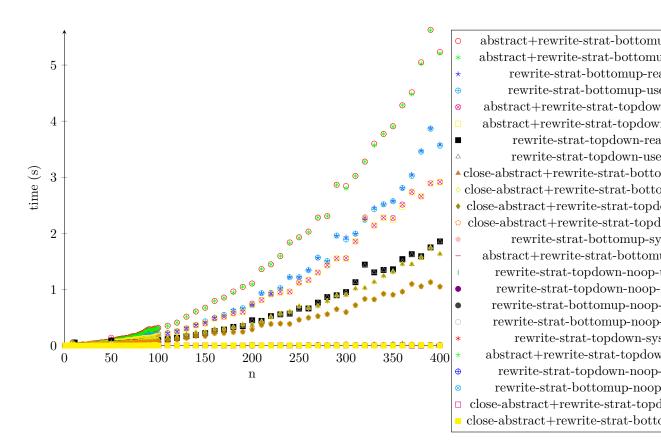


Figure 10: timing-rewrite-repeated-app-rewrite-strat

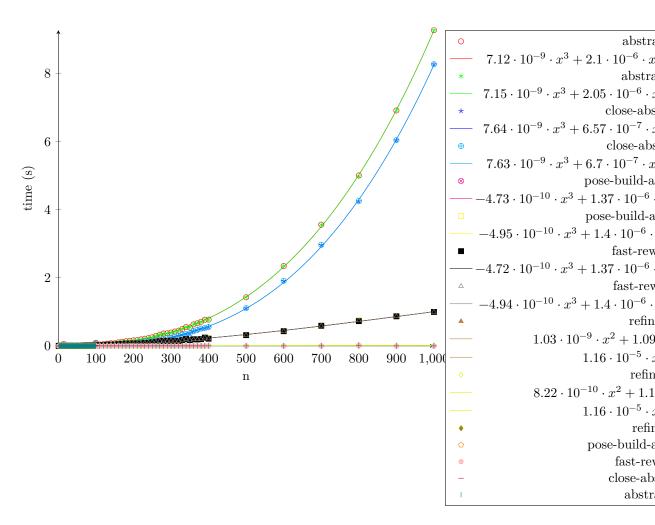
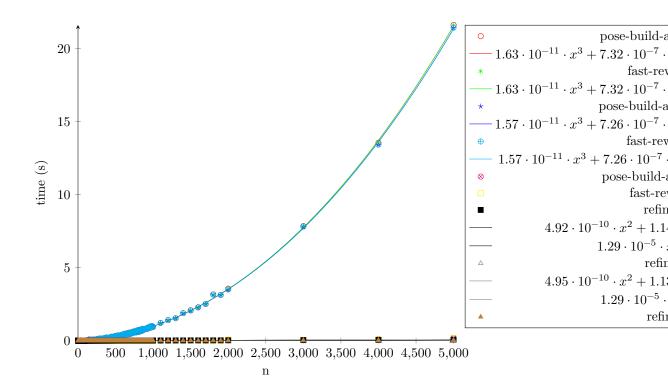
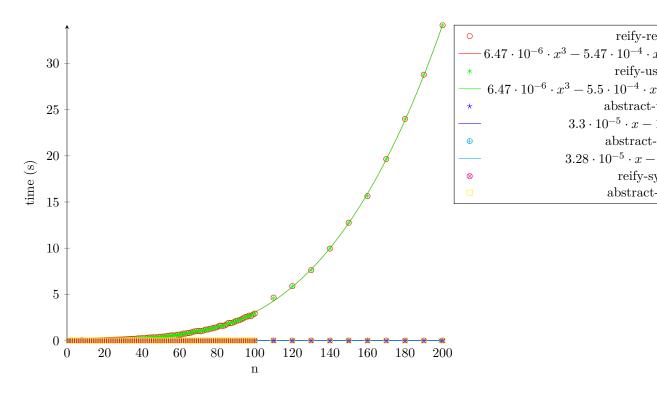


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

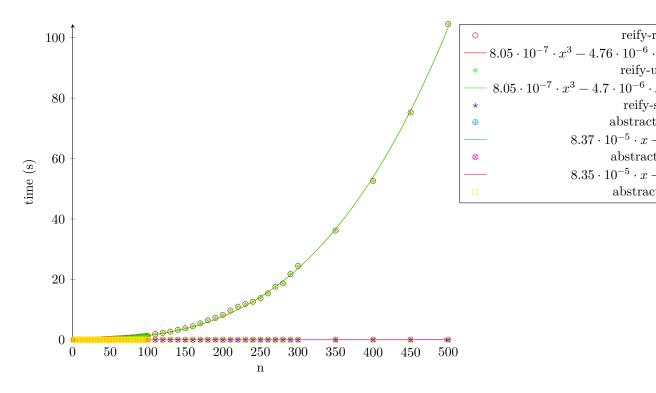
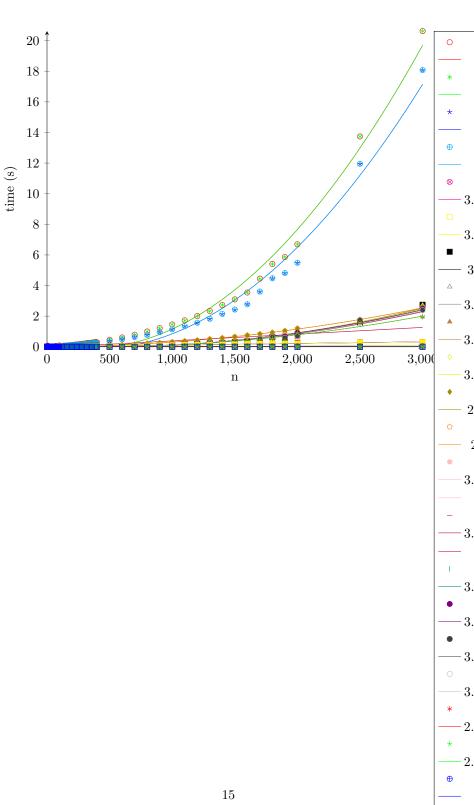


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.76 \cdot 10^{-6} \cdot x^2 - 1.78 \cdot 10^{-6}$ $2.76 \cdot 10^{-6} \cdot x^2 - 1.78 \cdot 10^{-6}$ $2.49 \cdot 10^{-6} \cdot x^2 - 1.82 \cdot 10^{-6}$ $2.49 \cdot 10^{-6} \cdot x^2 - 1.82 \cdot 10^{-6}$ $3.93 \cdot 10^{-7} \cdot x^2 - 3.45 \cdot 10^{-4} \cdot x^2$ $3.93 \cdot 10^{-7} \cdot x^2 - 3.44 \cdot 10^{-4} \cdot x^2$ $3.9 \cdot 10^{-7} \cdot x^2 - 3.42 \cdot 10^{-4} \cdot x$ $3.89 \cdot 10^{-7} \cdot x^2 - 3.42 \cdot 10^{-4} \cdot x^2$ $3.79 \cdot 10^{-7} \cdot x^2 - 3.16 \cdot 10^{-4} \cdot x^2$ $3.79 \cdot 10^{-7} \cdot x^2 - 3.16 \cdot 10^{-4} \cdot x^2$ $2.7 \cdot 10^{-7} \cdot x^2 + 3.78 \cdot 10^{-5} \cdot x$ $2.7 \cdot 10^{-7} \cdot x^2 + 3.86 \cdot 10^{-5} \cdot x^2$ $3.43 \cdot 10^{-7} \cdot x^2 - 2.73 \cdot 10^{-4} \cdot x^2$ $4.39 \cdot 10^{-4} \cdot x - 5.33 \cdot$ $3.43 \cdot 10^{-7} \cdot x^2 - 2.73 \cdot 10^{-4} \cdot x^2$ $3.58 \cdot 10^{-7} \cdot x^2 - 2.75 \cdot 10^{-4} \cdot x^2$ $3.58 \cdot 10^{-7} \cdot x^2 - 2.74 \cdot 10^{-4} \cdot x^2$ $3.49 \cdot 10^{-7} \cdot x^2 - 2.76 \cdot 10^{-4} \cdot x^2$ $3.49 \cdot 10^{-7} \cdot x^2 - 2.75 \cdot 10^{-4} \cdot x^2 = 2.75 \cdot 10^{-4} \cdot x^2 + 2.75 \cdot 10^{-4} \cdot x^2$ $2.79 \cdot 10^{-7} \cdot x^2 - 1.75 \cdot 10^{-4} \cdot x^2$ $2.79 \cdot 10^{-7} \cdot x^2 - 1.74 \cdot 10^{-4} \cdot x^2$ $1.09 \cdot 10^{-4} \cdot x - 7.07$ $1.08 \cdot 10^{-4} \cdot x - 8.17$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

type-admit-cast-re

type-admit-cast-us

type-admit-user

type-admit-real

type-pf-cast-user

type-pf-cast-real

close-abstract-use

close-abstract-rea

refine-user

refine-real

check-pf-cast-rea

check-admit-cast-u

check-admit-cast-r

check-admit-real

check-admit-user

build-eval-thunk-re

build-thunk-real

build-eval-thunk-u $1.08 \cdot 10^{-4} \cdot x - 8.91 \cdot$ build-thunk-user $1.07 \cdot 10^{-4} \cdot x - 9.84 \cdot$ ob ools I secon

 $4.4 \cdot 10^{-4} \cdot x - 5.33 \cdot$ check-pf-cast-use