

Figure 1: timing-pattern

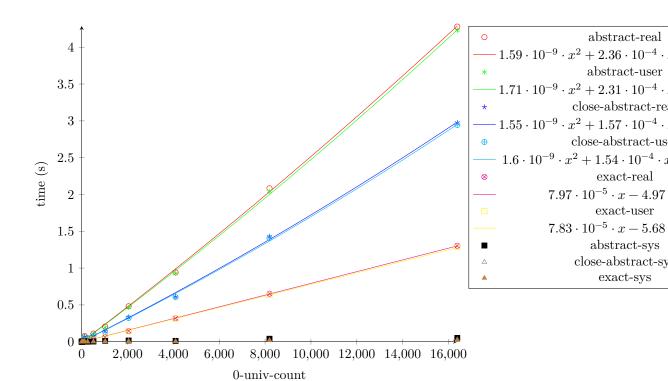


Figure 2: timing-n-polymorphic-universes param-1-n $\,0$

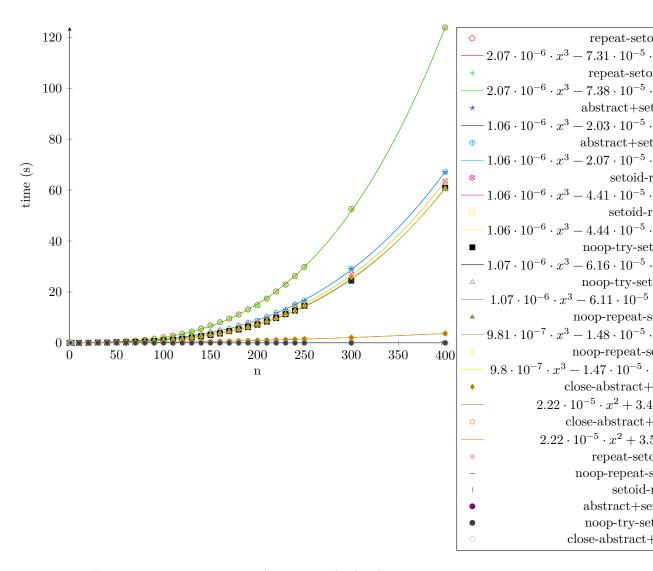


Figure 3: timing-repeat-setoid-rewrite-under-binders

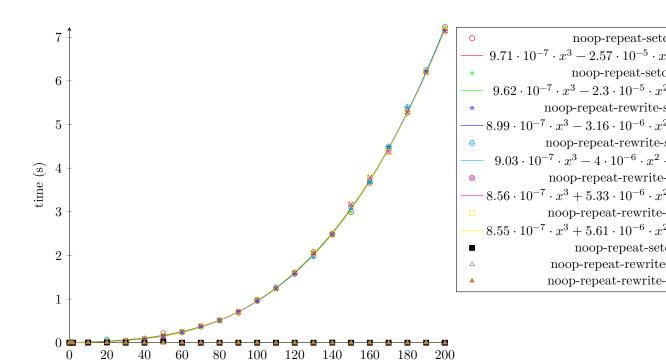


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

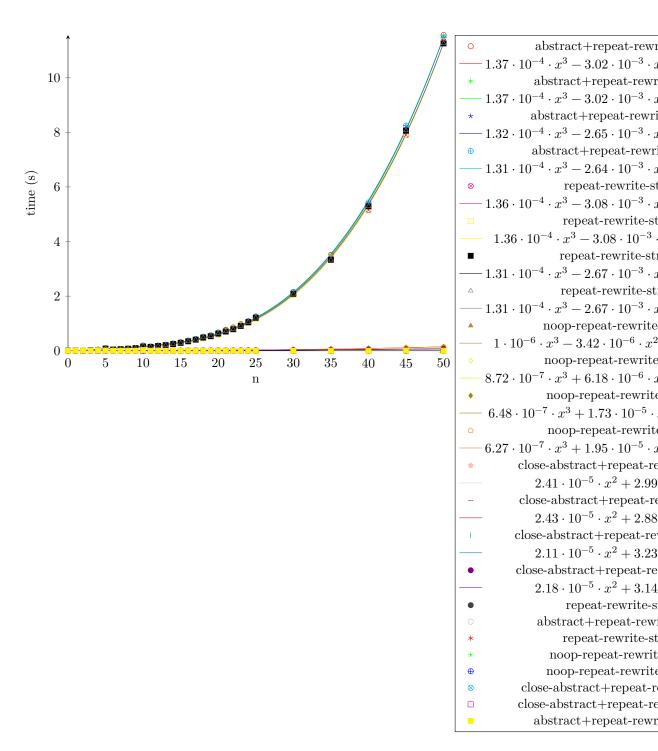


Figure 5: timing-rewrite-strat-under-binders

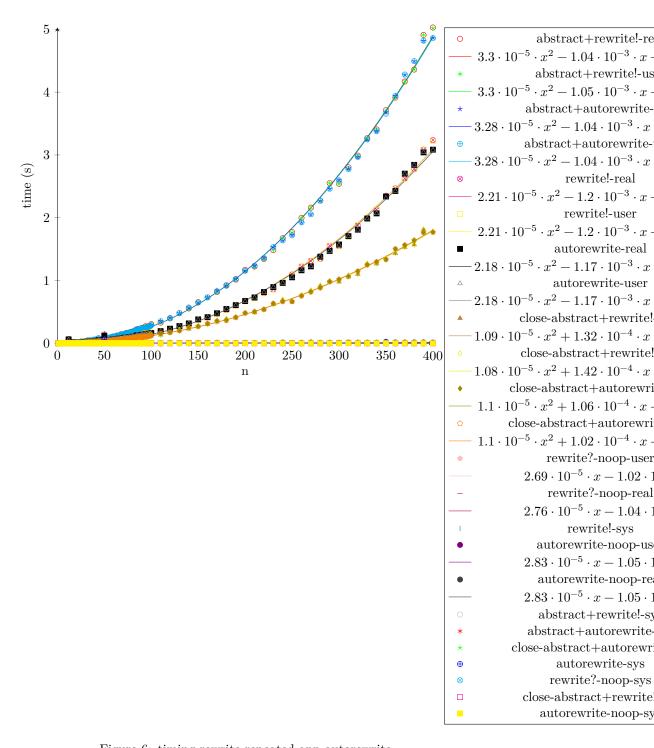
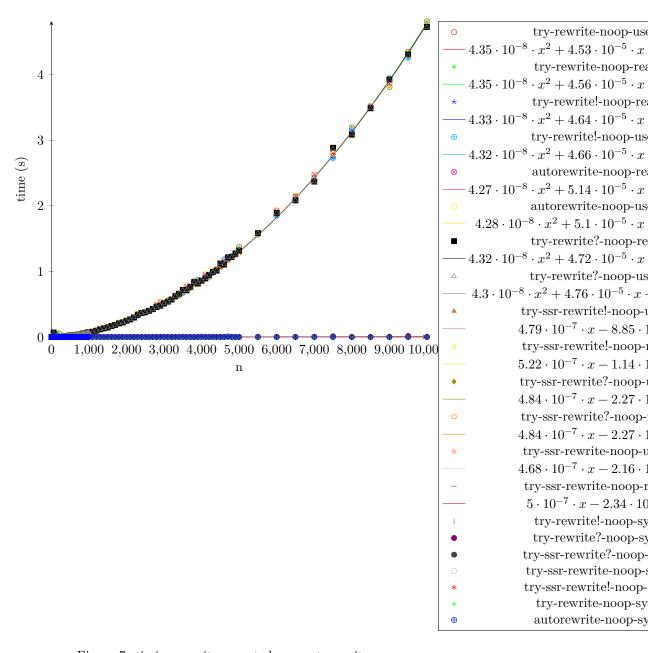


Figure 6: timing-rewrite-repeated-app-autorewrite



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

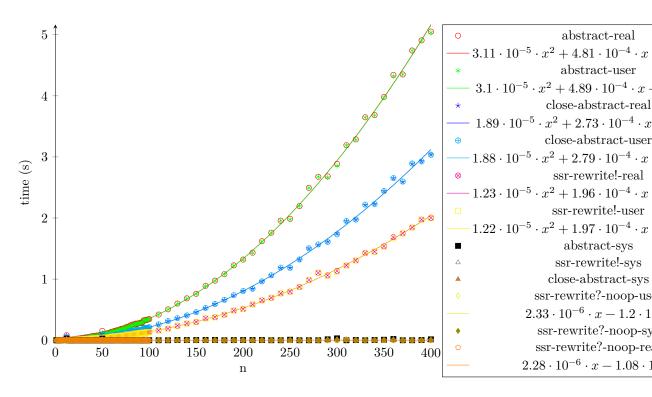


Figure 8: timing-rewrite-repeated-app-ssrrewrite

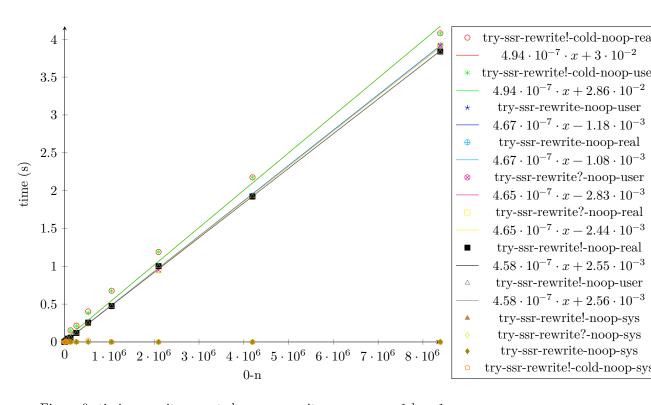


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

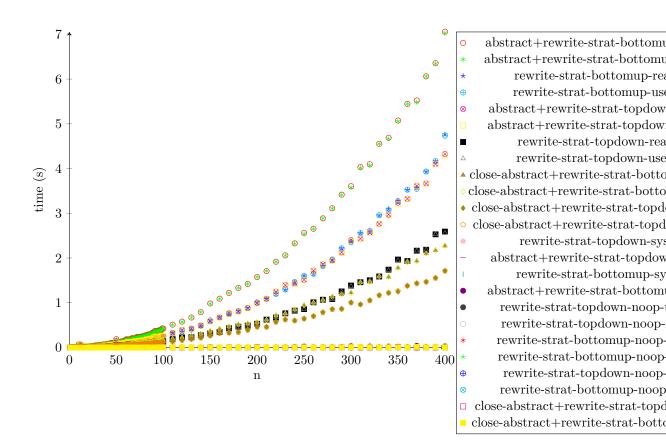
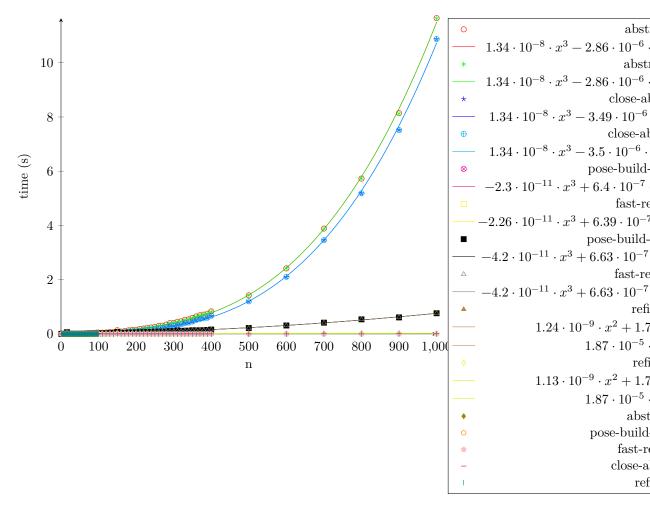
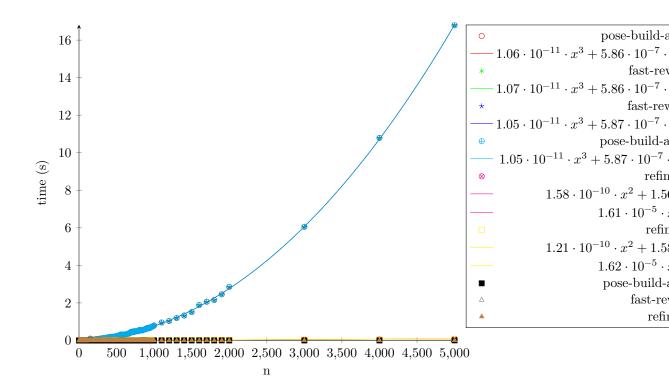


Figure 10: timing-rewrite-repeated-app-rewrite-strat

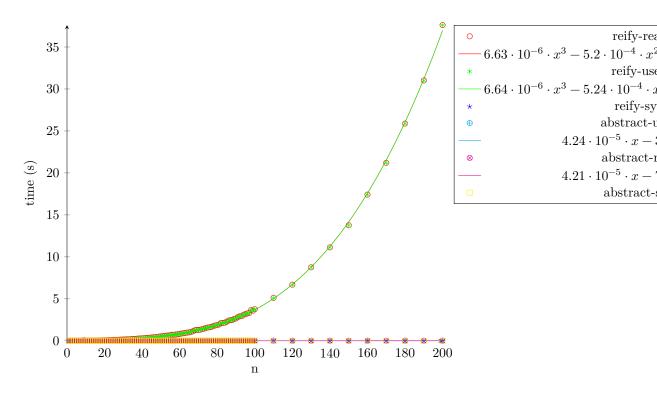


ref

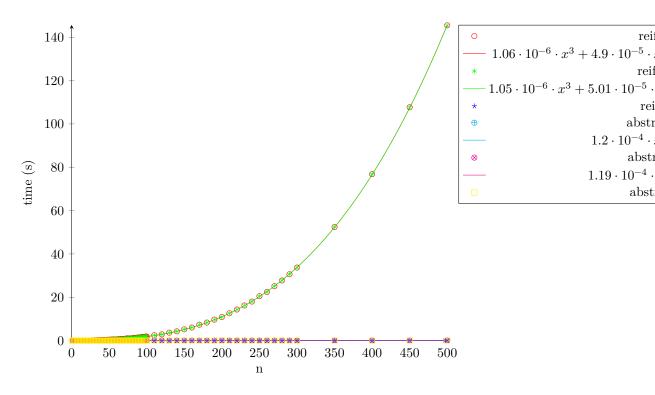
Figure 11: timing-rewrite-repeated-app-fast-rewrite



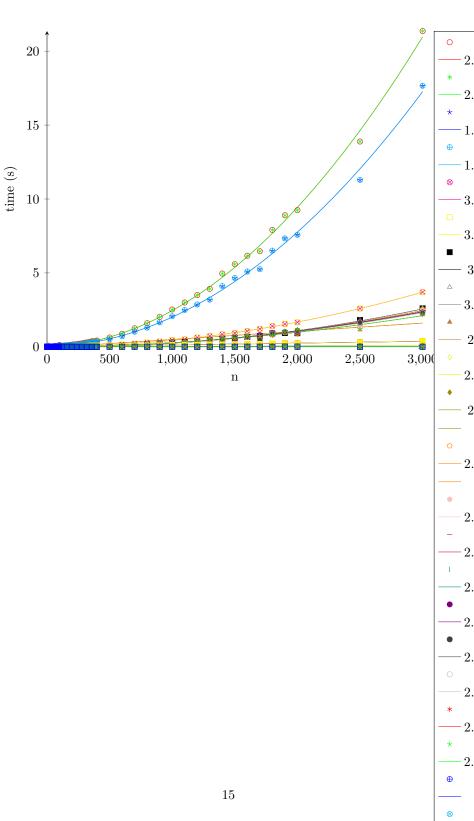
 $Figure~12:~timing\mbox{-rewrite-repeated-app-fast-rewrite-no-abstract}$



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



 ${\bf Figure~14:~timing-type class-reification-let-in-PHOAS}$



 $2.27 \cdot 10^{-6} \cdot x^2 + 1.68 \cdot 10^{-4} \cdot x^2$ $2.27 \cdot 10^{-6} \cdot x^2 + 1.65 \cdot 10^{-4} \cdot x^2$ $1.88 \cdot 10^{-6} \cdot x^2 + 1.23 \cdot 10^{-4} \cdot x^2$ $1.88 \cdot 10^{-6} \cdot x^2 + 1.21 \cdot 10^{-4} \cdot x^2$ $3.97 \cdot 10^{-7} \cdot x^2 + 4.28 \cdot 10^{-5} \cdot x^2 + 4.28 \cdot 10^{-5}$ $3.97 \cdot 10^{-7} \cdot x^2 + 4.28 \cdot 10^{-5} \cdot x^2$ $3.09 \cdot 10^{-7} \cdot x^2 - 7.4 \cdot 10^{-5} \cdot x$ $3.09 \cdot 10^{-7} \cdot x^2 - 7.39 \cdot 10^{-5} \cdot x^2 = 7.39 \cdot 10^{-5} \cdot x^2 + 10^{-5}$ $2.82 \cdot 10^{-7} \cdot x^2 - 3.18 \cdot 10^{-5} \cdot$ $2.82 \cdot 10^{-7} \cdot x^2 - 3.14 \cdot 10^{-5} \cdot x^2 = 3.14 \cdot 10^{-5} \cdot x^2 + 3.14 \cdot 10^{-5} \cdot x^2$ $2.84 \cdot 10^{-7} \cdot x^2 - 3.59 \cdot 10^{-5}$ $5.55 \cdot 10^{-4} \cdot x - 6.05 \cdot$ $2.84 \cdot 10^{-7} \cdot x^2 - 3.55 \cdot 10^{-5} \cdot x^2$ $5.55 \cdot 10^{-4} \cdot x - 6.05 \cdot$ $2.65 \cdot 10^{-7} \cdot x^2 - 4.31 \cdot 10^{-6} \cdot x^2 = 4.31 \cdot 10^{-6} \cdot x^2 + 1.00 \cdot x^2 +$ $2.65 \cdot 10^{-7} \cdot x^2 - 3.31 \cdot 10^{-6} \cdot x^2$ $2.57 \cdot 10^{-7} \cdot x^2 + 1.81 \cdot 10^{-5} \cdot x^2$ $2.57 \cdot 10^{-7} \cdot x^2 + 1.85 \cdot 10^{-5} \cdot x^2$ $2.61 \cdot 10^{-7} \cdot x^2 - 1.19 \cdot 10^{-5} \cdot x^2 - 1.19 \cdot 10^{-5} \cdot x^2 + 1.19 \cdot 10^{-5} \cdot x^2$ $2.61 \cdot 10^{-7} \cdot x^2 - 1.22 \cdot 10^{-5} \cdot x^2$ $2.12 \cdot 10^{-7} \cdot x^2 + 7.04 \cdot 10^{-5} \cdot x^2$ $2.12 \cdot 10^{-7} \cdot x^2 + 7.04 \cdot 10^{-5} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-use

close-abstract-rea

check-admit-cast-u

check-admit-cast-r

type-pf-cast-user

type-pf-cast-real

refine-user

refine-real

check-pf-cast-use

check-pf-cast-rea

type-admit-cast-us

type-admit-cast-re

type-admit-user

type-admit-real

check-admit-user

check-admit-real

 $1.24 \cdot 10^{-4} \cdot x - 1.36$