

Figure 1: timing-pattern

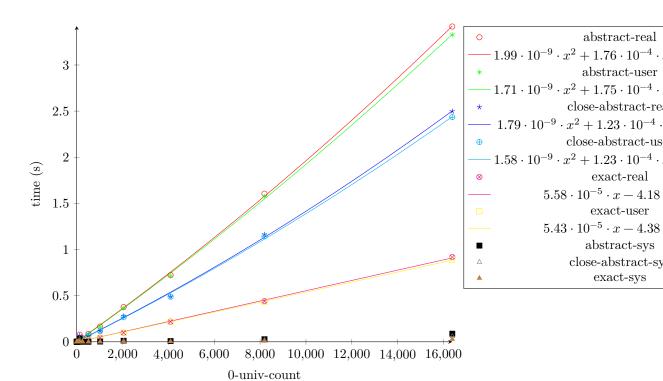


Figure 2: timing-n-polymorphic-universes param-1-n 0

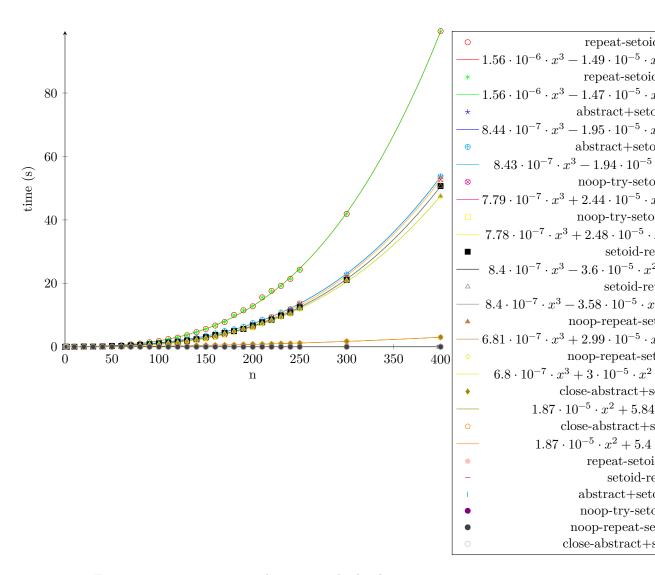


Figure 3: timing-repeat-setoid-rewrite-under-binders

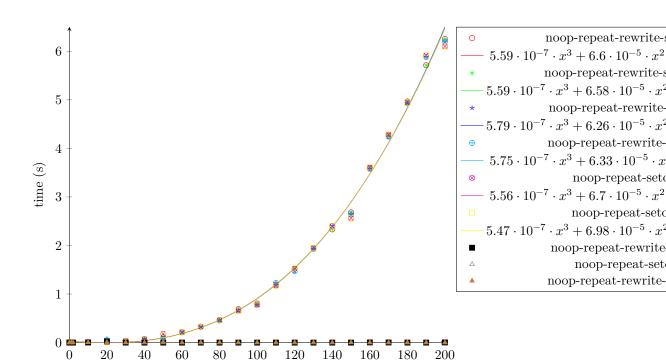


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

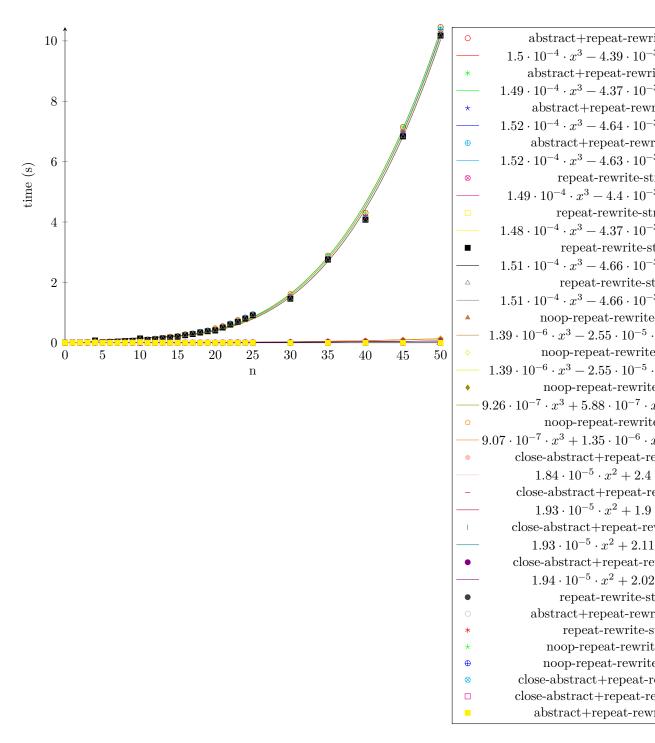


Figure 5: timing-rewrite-strat-under-binders

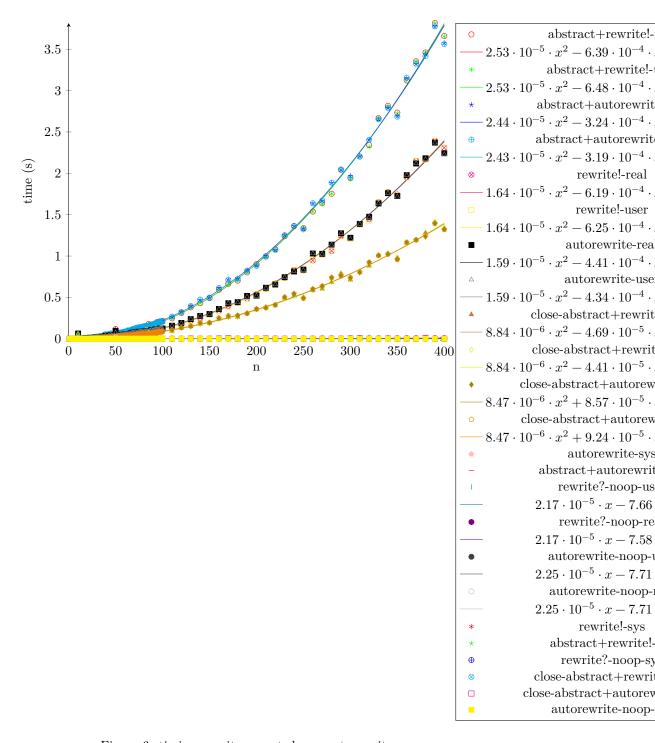
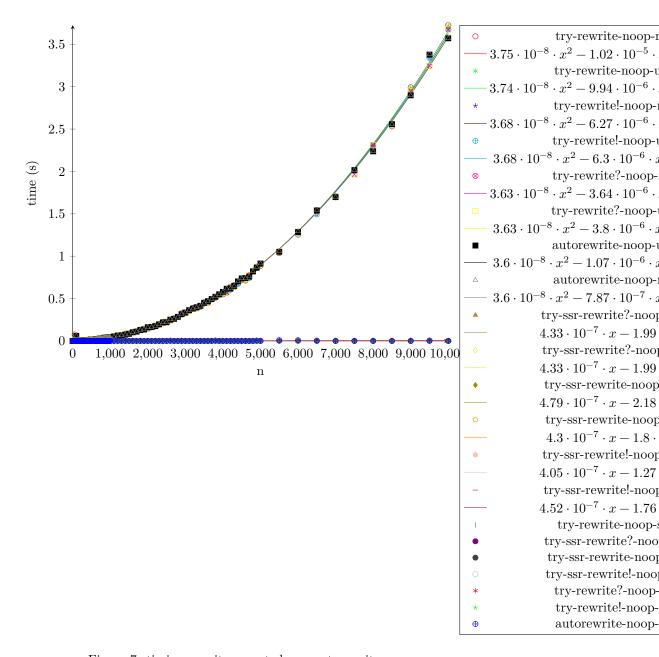


Figure 6: timing-rewrite-repeated-app-autorewrite



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

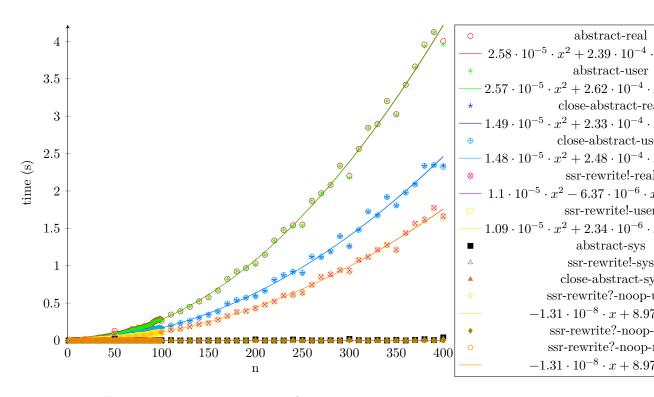


Figure 8: timing-rewrite-repeated-app-ssrrewrite

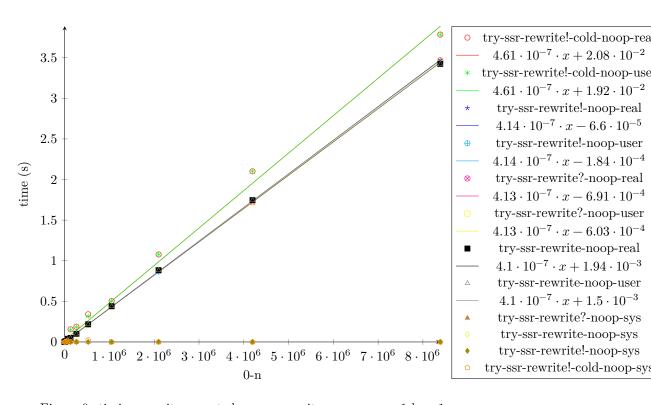


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

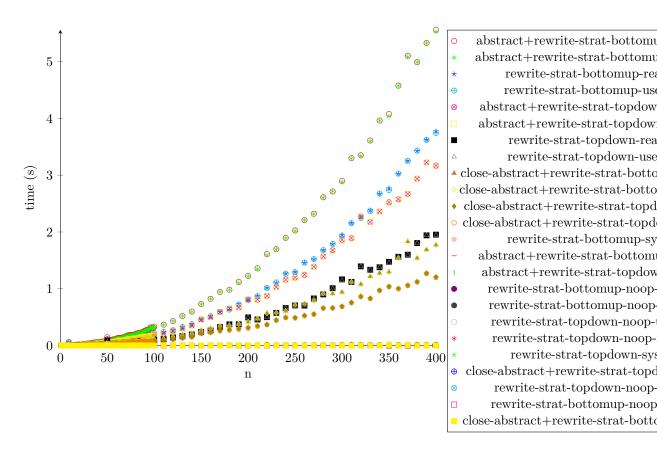


Figure 10: timing-rewrite-repeated-app-rewrite-strat

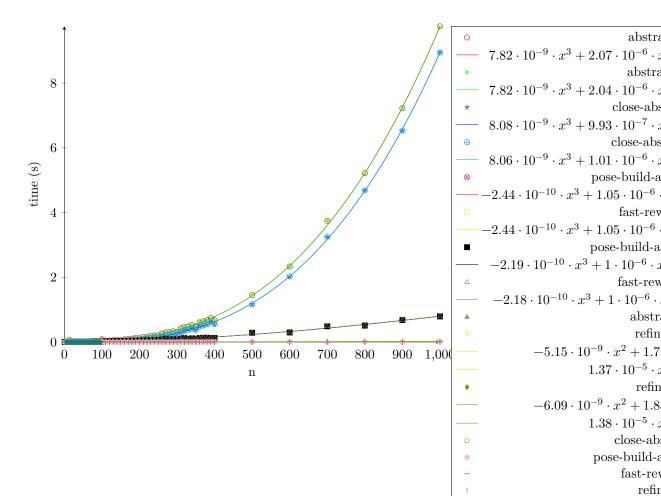
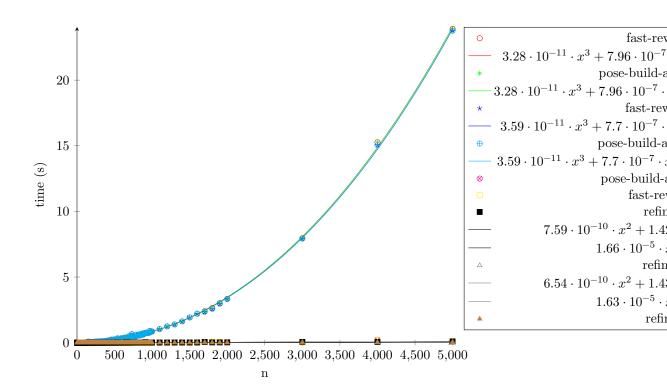
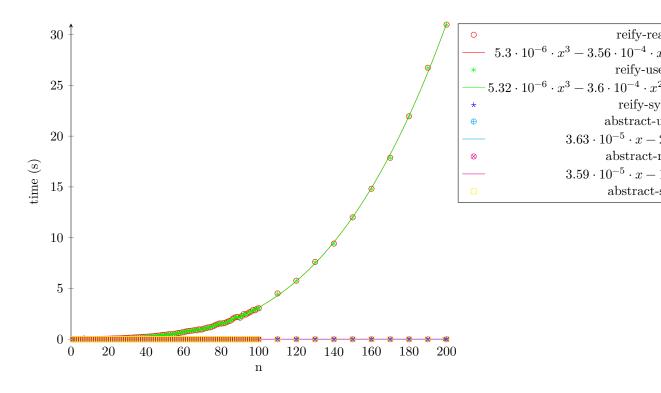


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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



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

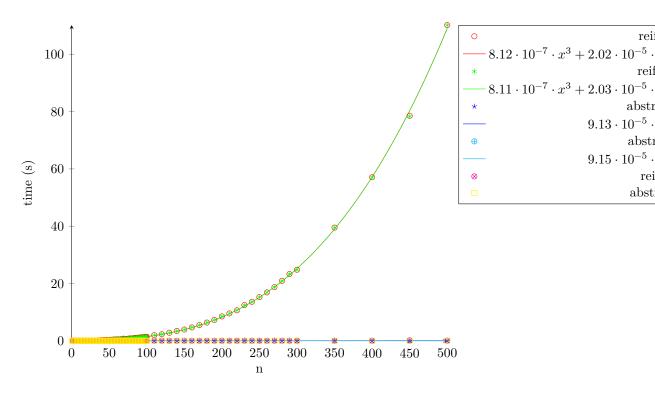
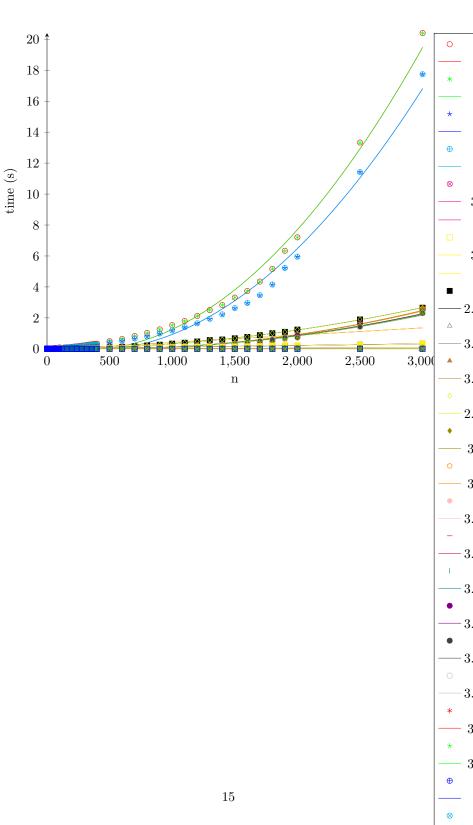


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.67 \cdot 10^{-6} \cdot x^2 - 1.57 \cdot 10^{-6}$ $2.67 \cdot 10^{-6} \cdot x^2 - 1.57 \cdot 10^{-6}$ $2.39 \cdot 10^{-6} \cdot x^2 - 1.62 \cdot 10^{-6}$ $2.39 \cdot 10^{-6} \cdot x^2 - 1.62 \cdot 10^{-6}$ $3.61 \cdot 10^{-7} \cdot x^2 - 2.8 \cdot 10^{-4} \cdot x^2$ $3.61 \cdot 10^{-7} \cdot x^2 - 2.8 \cdot 10^{-4} \cdot x^2$ $2.81 \cdot 10^{-7} \cdot x^2 + 4.57 \cdot 10^{-5} \cdot x^2$ $3.73 \cdot 10^{-7} \cdot x^2 - 3.06 \cdot 10^{-4} \cdot x^2$ $3.73 \cdot 10^{-7} \cdot x^2 - 3.06 \cdot 10^{-4} \cdot x^2$ $2.81 \cdot 10^{-7} \cdot x^2 + 4.64 \cdot 10^{-5} \cdot x^2$ $3.7 \cdot 10^{-7} \cdot x^2 - 2.91 \cdot 10^{-4} \cdot x$ $3.69 \cdot 10^{-7} \cdot x^2 - 2.9 \cdot 10^{-4} \cdot x$ $3.14 \cdot 10^{-7} \cdot x^2 - 2.14 \cdot 10^{-4} \cdot x^2$ $3.14 \cdot 10^{-7} \cdot x^2 - 2.13 \cdot 10^{-4} \cdot x^2$ $3.31 \cdot 10^{-7} \cdot x^2 - 2.43 \cdot 10^{-4} \cdot x^2$ $3.31 \cdot 10^{-7} \cdot x^2 - 2.43 \cdot 10^{-4} \cdot x^2$ $3.11 \cdot 10^{-7} \cdot x^2 - 2.14 \cdot 10^{-4} \cdot x^2$ $3.11 \cdot 10^{-7} \cdot x^2 - 2.14 \cdot 10^{-4} \cdot x^2$ $3.24 \cdot 10^{-7} \cdot x^2 - 2.4 \cdot 10^{-4} \cdot x$ $3.24 \cdot 10^{-7} \cdot x^2 - 2.4 \cdot 10^{-4} \cdot x$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

refine-user

refine-real

 $4.7 \cdot 10^{-4} \cdot x - 5.69 \cdot$

 $4.7 \cdot 10^{-4} \cdot x - 5.69 \cdot$

close-abstract-rea

type-admit-cast-us

type-admit-cast-re

close-abstract-use

type-pf-cast-real

type-pf-cast-user

check-admit-cast-r

check-admit-cast-u

type-admit-real

type-admit-user

check-admit-real

check-admit-user

check-pf-cast-use

check-pf-cast-rea

build-eval-thunk-ua

 $1.08 \cdot 10^{-4} \cdot x - 7.46 \cdot$ build-eval-thunk-re $1.09 \cdot 10^{-4} \cdot x - 5.29$ build-thunk-user $1.08 \cdot 10^{-4} \cdot x - 8.25 \cdot$ build-thunk-real $1.08 \cdot 10^{-4} \cdot x - 6.28 \cdot$ oboole I man