

Figure 1: timing-pattern

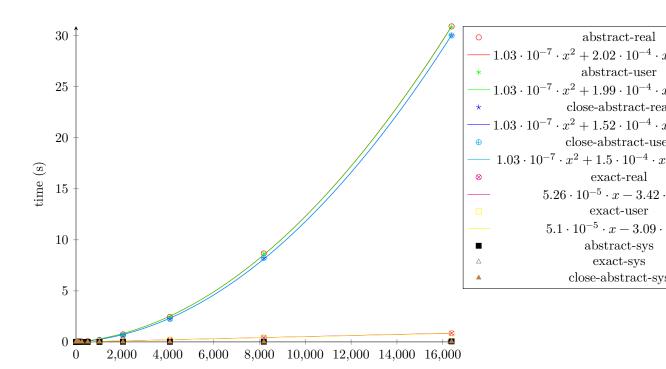


Figure 2: timing-n-polymorphic-universes param-1-n 0

-univ-count

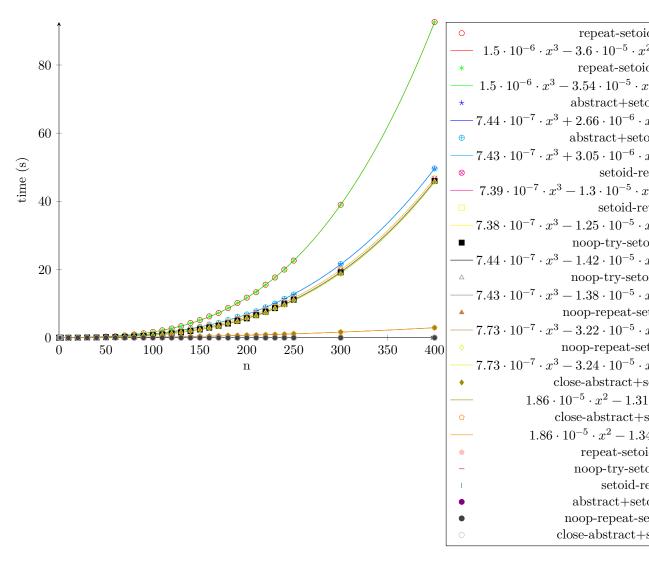


Figure 3: timing-repeat-setoid-rewrite-under-binders

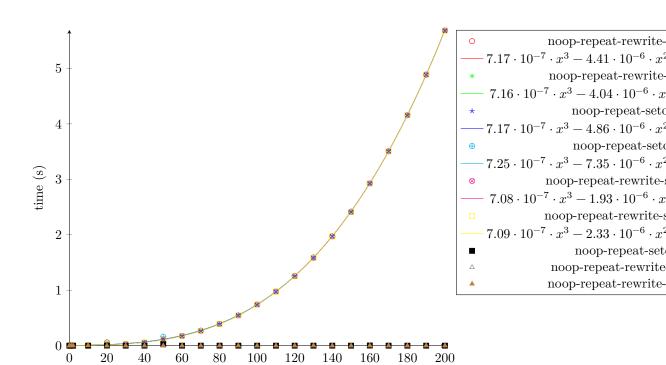


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

n

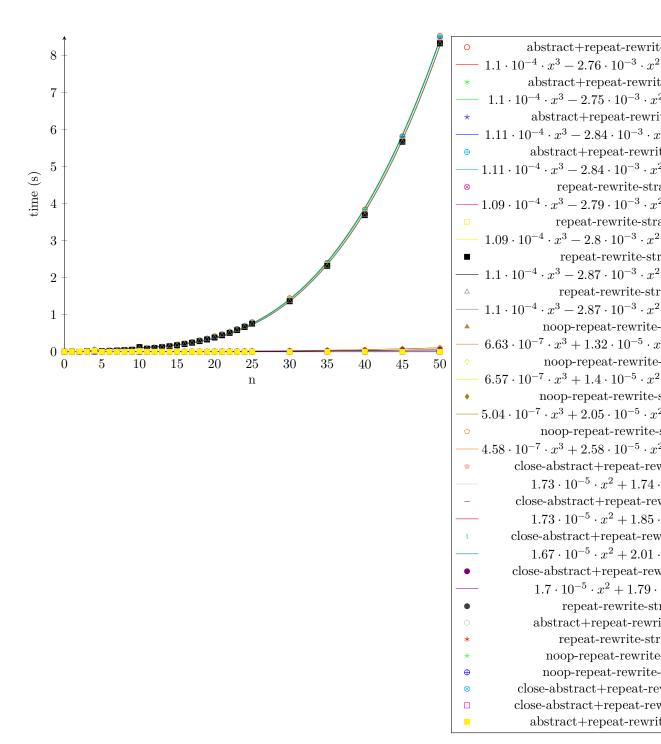


Figure 5: timing-rewrite-strat-under-binders

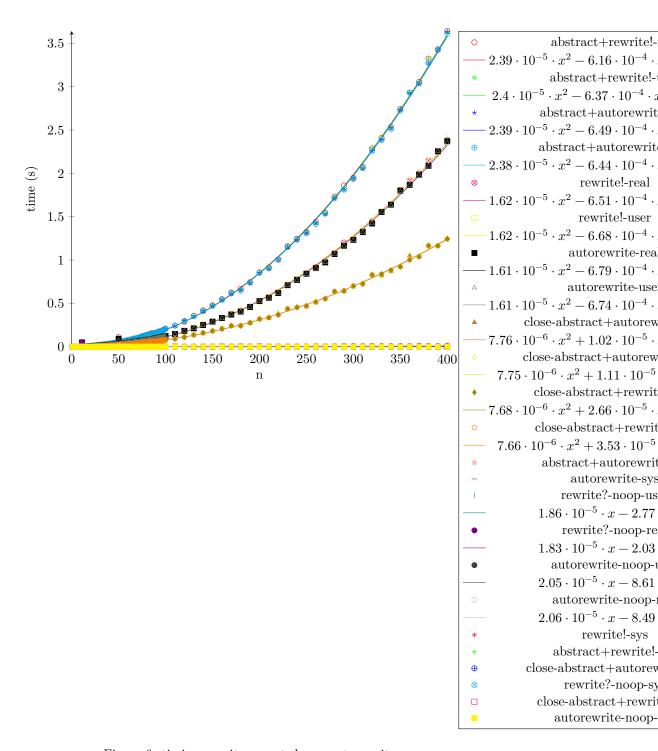


Figure 6: timing-rewrite-repeated-app-autorewrite

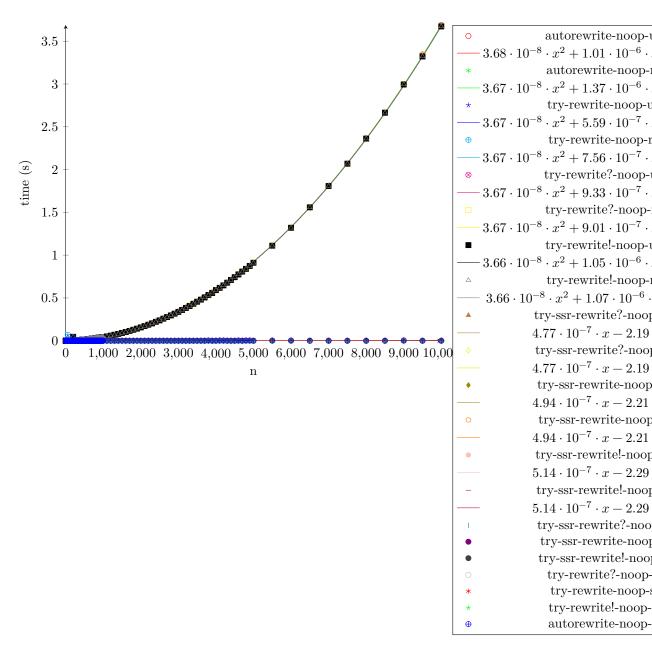


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

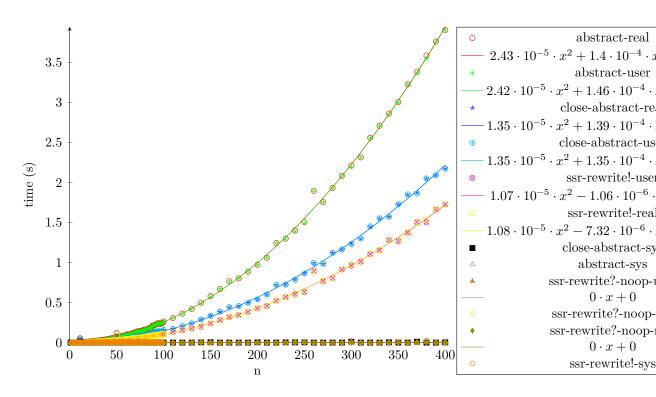


Figure 8: timing-rewrite-repeated-app-ssrrewrite

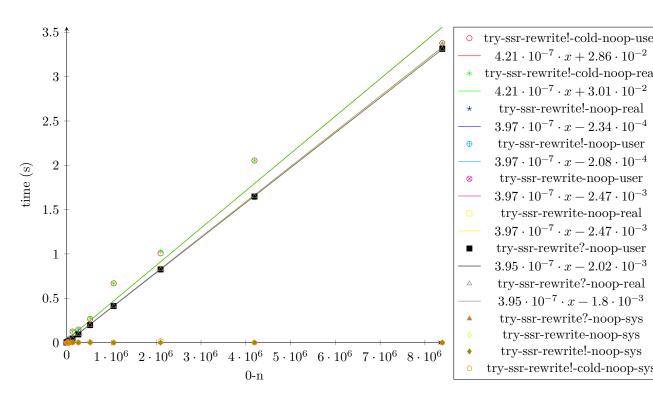


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn 1

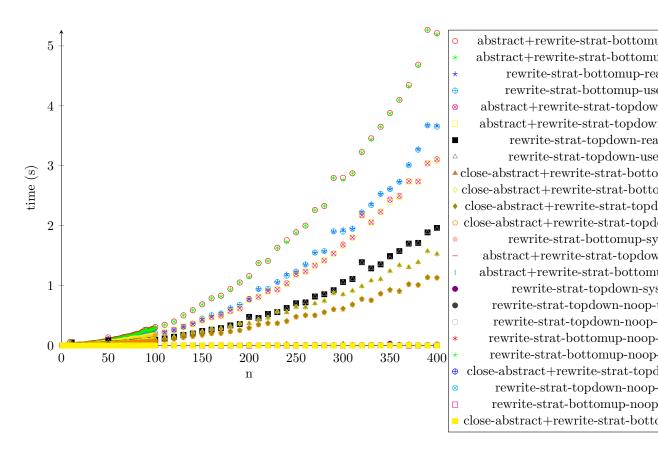


Figure 10: timing-rewrite-repeated-app-rewrite-strat

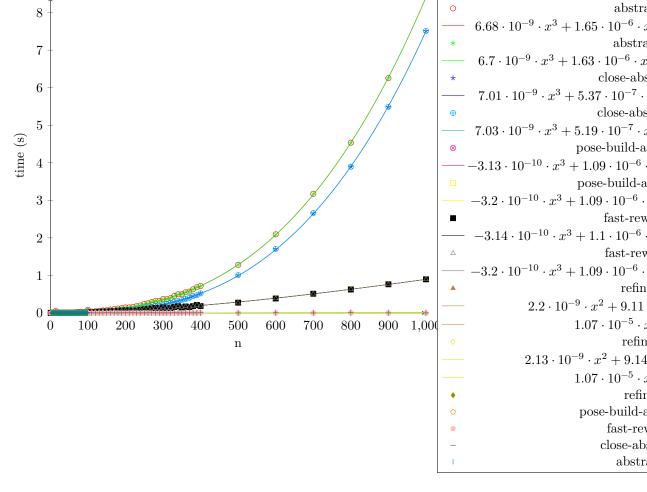
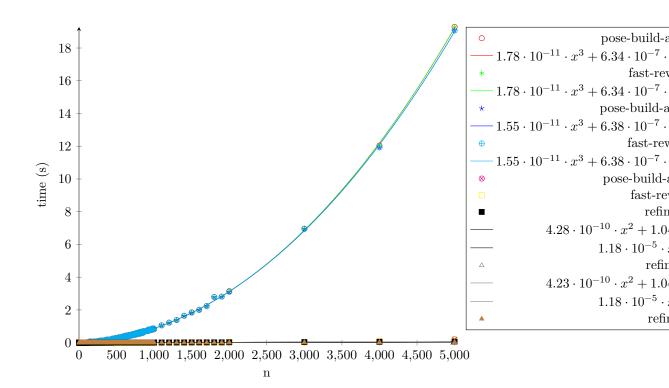


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

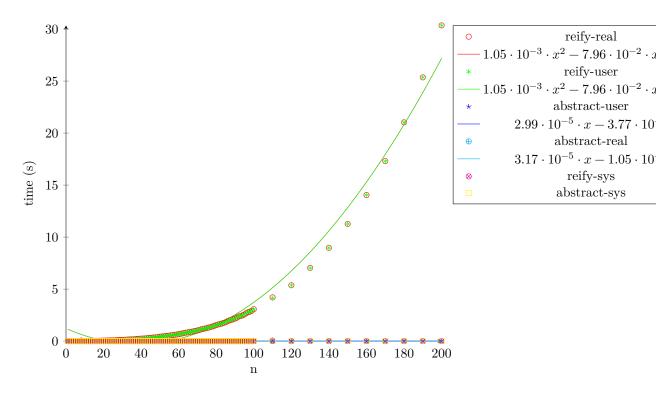


Figure 13: timing-typeclass-reification-let-in-HOAS

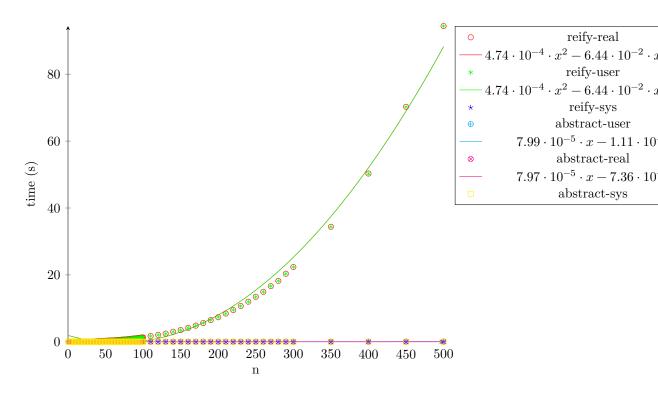
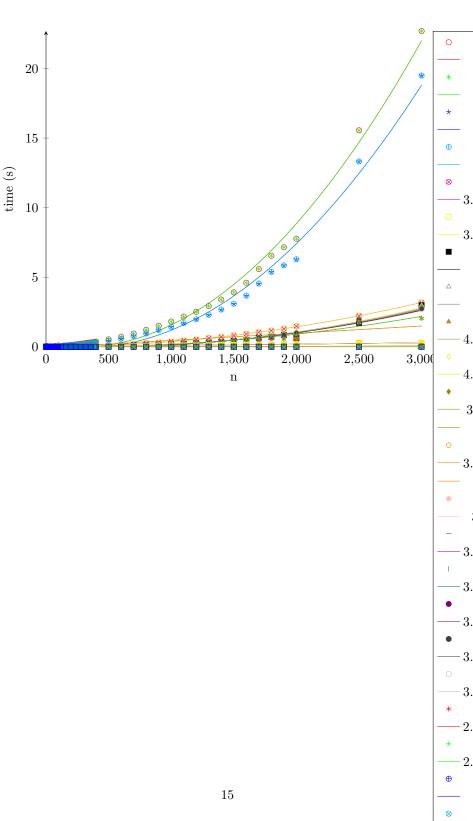


Figure 14: timing-typeclass-reification-let-in-PHOAS



 $2.93 \cdot 10^{-6} \cdot x^2 - 1.51 \cdot 10^{-6}$ $2.93 \cdot 10^{-6} \cdot x^2 - 1.51 \cdot 10^{-6}$ $2.59 \cdot 10^{-6} \cdot x^2 - 1.54 \cdot 10^{-6}$ $2.59 \cdot 10^{-6} \cdot x^2 - 1.54 \cdot 10^{-6}$ $3.43 \cdot 10^{-7} \cdot x^2 + 3.39 \cdot 10^{-5} \cdot x^2$ $3.43 \cdot 10^{-7} \cdot x^2 + 3.38 \cdot 10^{-5} \cdot x^2$ $4 \cdot 10^{-7} \cdot x^2 - 3 \cdot 10^{-4} \cdot x +$ $4 \cdot 10^{-7} \cdot x^2 - 3 \cdot 10^{-4} \cdot x +$ $4.11 \cdot 10^{-7} \cdot x^2 - 3.06 \cdot 10^{-4} \cdot x^2$ $4.11 \cdot 10^{-7} \cdot x^2 - 3.06 \cdot 10^{-4} \cdot x^2$ $3.72 \cdot 10^{-7} \cdot x^2 - 2.55 \cdot 10^{-4}$ $3.72 \cdot 10^{-7} \cdot x^2 - 2.54 \cdot 10^{-4} \cdot x^2$ $3.69 \cdot 10^{-7} \cdot x^2 - 2.34 \cdot 10^{-4}$ $3.69 \cdot 10^{-7} \cdot x^2 - 2.34 \cdot 10^{-4} \cdot x^2$ $3.78 \cdot 10^{-7} \cdot x^2 - 2.62 \cdot 10^{-4} \cdot x^2$ $3.78 \cdot 10^{-7} \cdot x^2 - 2.62 \cdot 10^{-4} \cdot x^2$ $3.78 \cdot 10^{-7} \cdot x^2 - 2.42 \cdot 10^{-4} \cdot x^2$ $3.78 \cdot 10^{-7} \cdot x^2 - 2.42 \cdot 10^{-4} \cdot x^2$ $2.78 \cdot 10^{-7} \cdot x^2 - 1.07 \cdot 10^{-4} \cdot x^2$ $2.78 \cdot 10^{-7} \cdot x^2 - 1.06 \cdot 10^{-4} \cdot x^2$

abstract-real

abstract-user

fast-rewrite-real

fast-rewrite-user

close-abstract-use

close-abstract-rea

type-admit-cast-us

type-admit-cast-re

check-admit-cast-u

check-admit-cast-r

 $5.18 \cdot 10^{-4} \cdot x - 6.14 \cdot$ refine-real

 $5.18 \cdot 10^{-4} \cdot x - 6.14 \cdot$ check-pf-cast-use

check-pf-cast-rea

type-pf-cast-user

type-pf-cast-real

type-admit-user

type-admit-real

check-admit-real

check-admit-user

build-eval-thunk-u

 $9.56 \cdot 10^{-5} \cdot x - 6.42 \cdot$ build-eval-thunk-re $9.56 \cdot 10^{-5} \cdot x - 4.31 \cdot$ build-thunk-user $9.49 \cdot 10^{-5} \cdot x - 7.97 \cdot$ build-thunk-real $9.49 \cdot 10^{-5} \cdot x - 5.93 \cdot$ obook I nool

refine-user