

Figure 1: timing-pattern

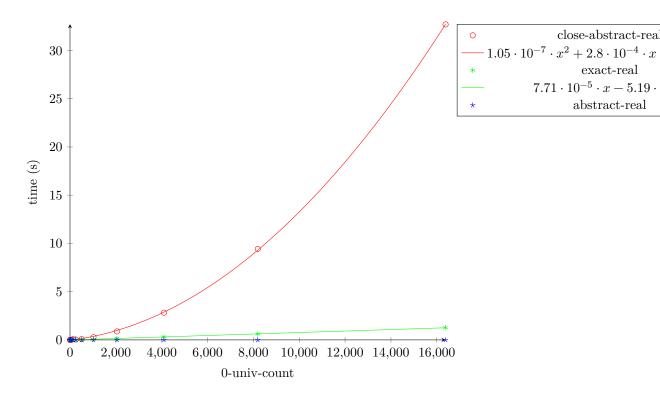
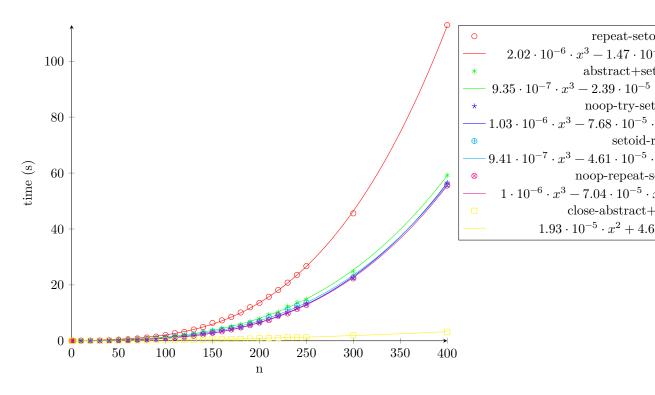


Figure 2: timing-n-polymorphic-universes param-1-n 0



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

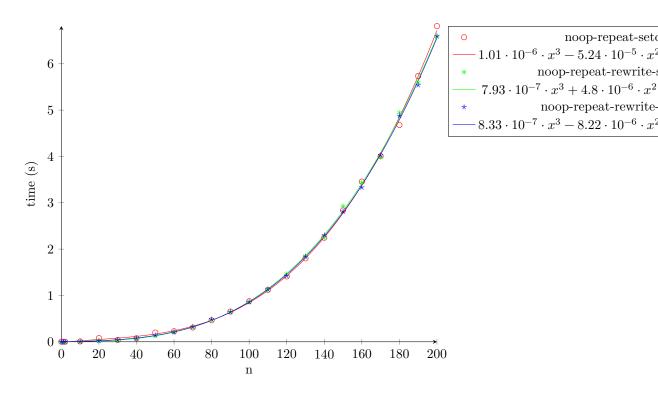
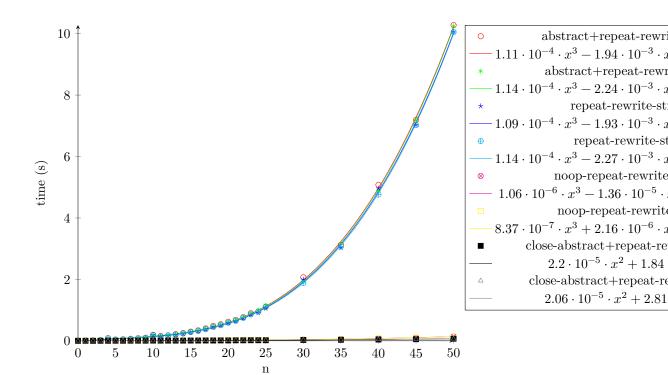
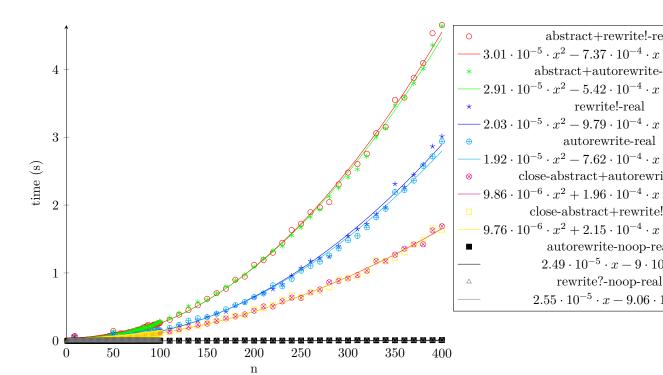


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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



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

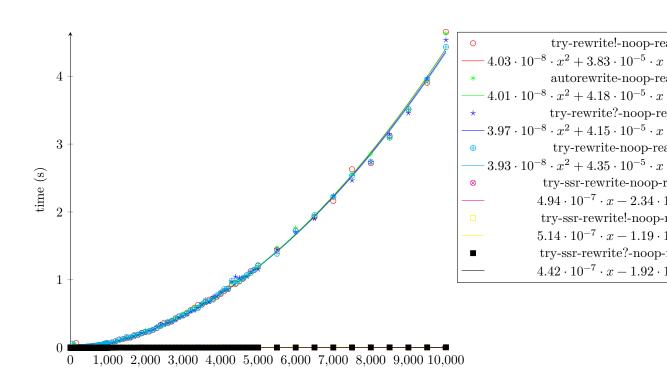
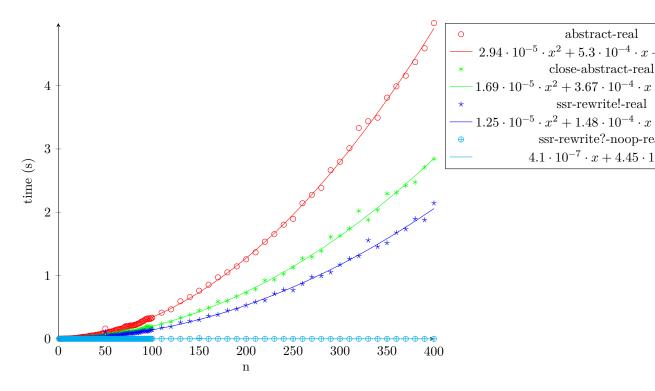
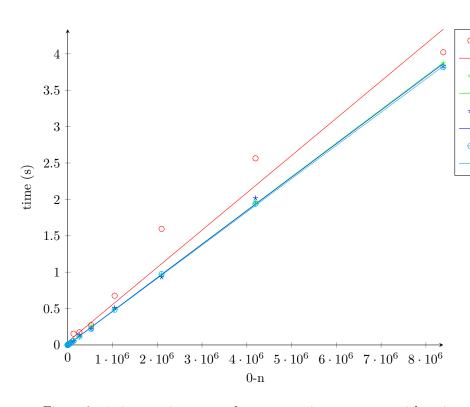


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



 ${\bf Figure~8:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}ssrrewrite}$



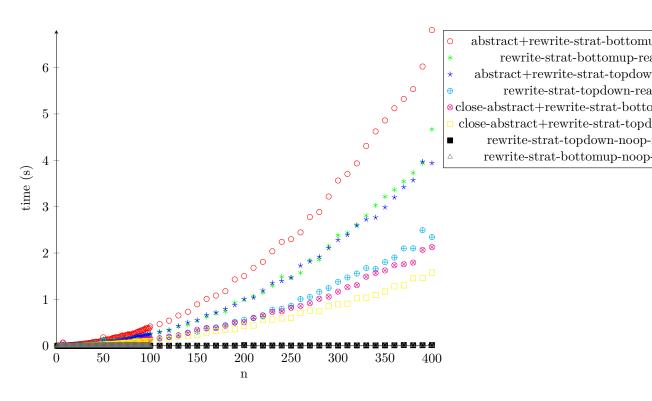
try-ssr-rewrite!-cold-noop-rea $5.12\cdot 10^{-7}\cdot x + 4.18\cdot 10^{-2}$

try-ssr-rewrite?-noop-real $4.62\cdot 10^{-7}\cdot x - 7.13\cdot 10^{-5}$

try-ssr-rewrite!-noop-real $4.6 \cdot 10^{-7} \cdot x + 2.29 \cdot 10^{-3}$

try-ssr-rewrite-noop-real $4.57\cdot 10^{-7}\cdot x - 5.15\cdot 10^{-5}$

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

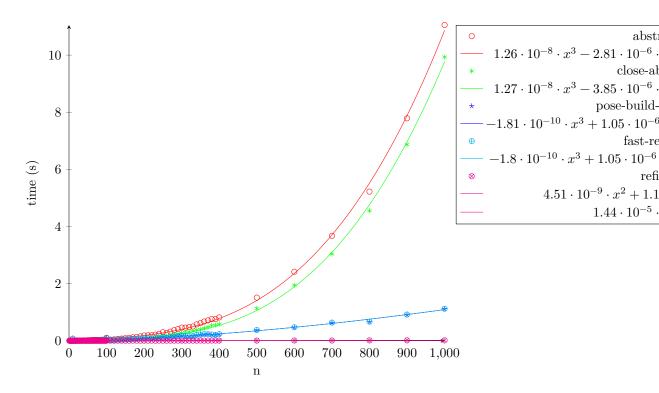


rewrite-strat-bottomup-rea

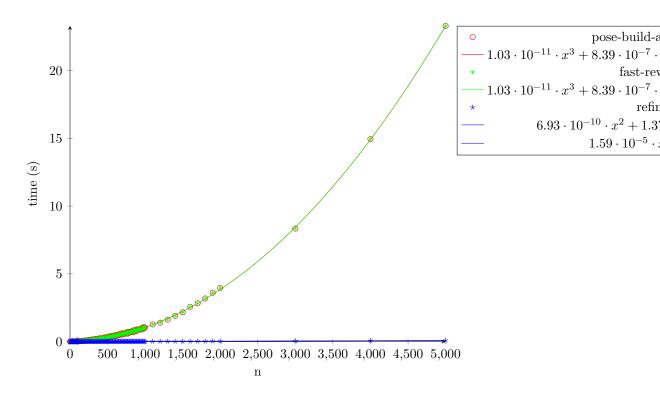
abstract + rewrite - strat - topdowrewrite-strat-topdown-rea

rewrite-strat-topdown-nooprewrite-strat-bottomup-noop-

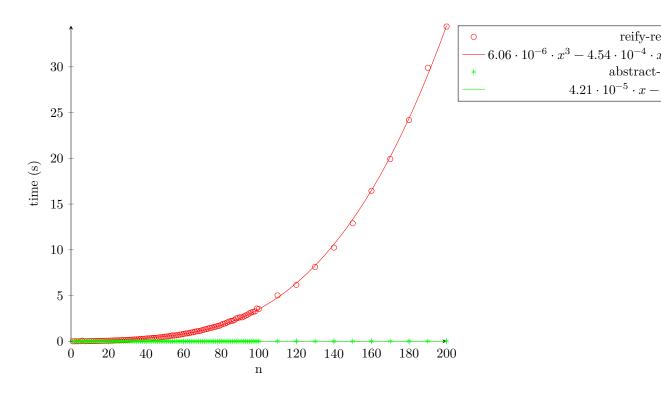
 $Figure~10:~timing\mbox{-rewrite-repeated-app-rewrite-strat}$



 $Figure~11:~timing\mbox{-rewrite-repeated-app-fast-rewrite}$



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



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

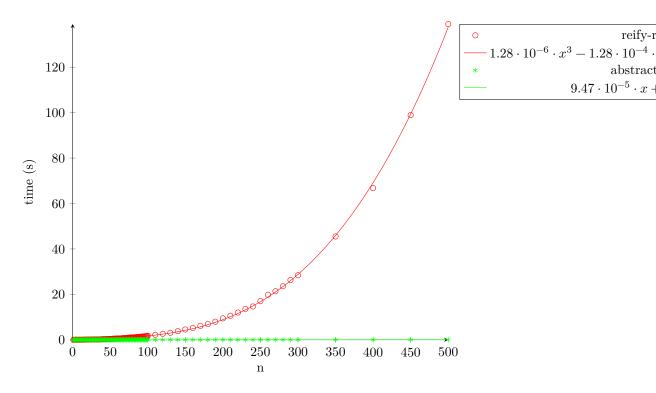
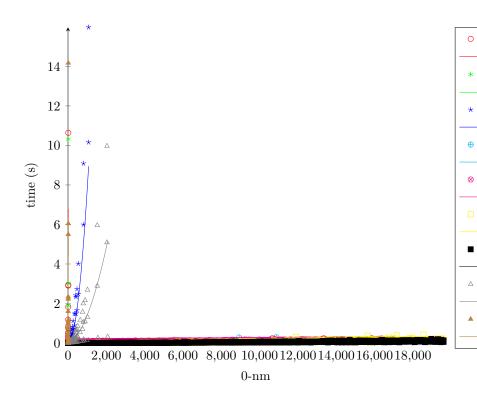


Figure 14: timing-typeclass-reification-let-in-PHOAS



rewrite-strat(topdown-bot $6.77 \cdot 10^{-3} exp(0.46 \cdot ($

rewrite-strat (bottomup-bot 7.9 \cdot 10⁻³ exp (0.45 \cdot (0

 $7.81 \cdot 10^{-6} \cdot x^2 - 1.04 \cdot 10^{-4} \cdot$

 $1.36 \cdot 10^{-10} \cdot x^2 + 5.27 \cdot 10^{-6} \cdot$

 $2.58 \cdot 10^{-11} \cdot x^2 + 6.09 \cdot 10^{-6} \cdot$

 $2.35\cdot 10^{-10}\cdot x^2 + 4.56\cdot 10^{-6}\cdot \\$

 $1.25 \cdot 10^{-10} \cdot x^2 + 3.44 \cdot 10^{-6} \cdot$

 $1.01 \cdot 10^{-6} \cdot x^2 + 4.19 \cdot 10^{-4} \cdot x^2$

 $-8.24 \cdot 10^{-3} \cdot x^3 + 0.26 \cdot x^2 -$

cps+cbn-real

cps+vm-compute-

cps+native-compute

cps+lazy-real

 $_{\rm cps+cbv\text{-}real}$

cps+simpl-real

setoid-rewrite-re

Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

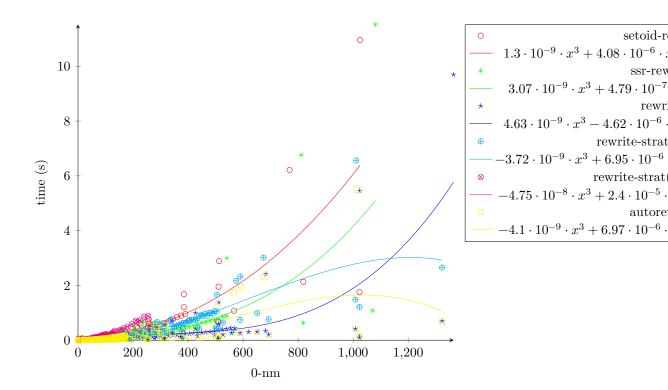
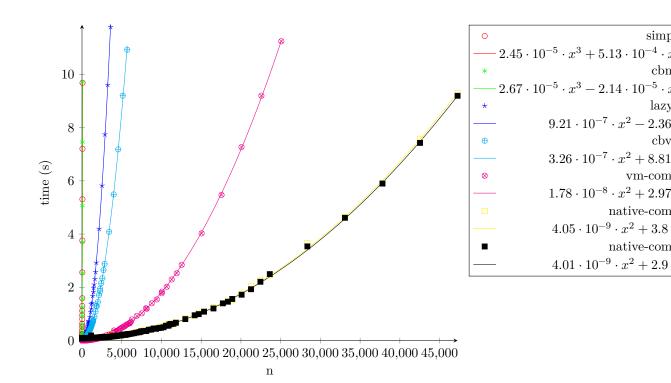
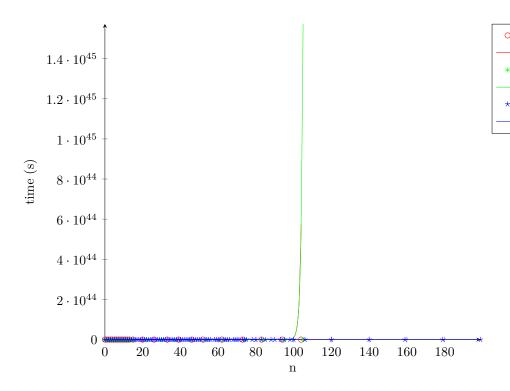


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



simp

 $Figure\ 17:\ timing\mbox{-sieve-of-eratos} thenes$



rewrite-

rewrite

 $-1.69 \cdot 10^{-6} \cdot x^3 + 4.76 \cdot 1$

Figure 18: timing-rewrite-under-lets-plus-0 $\,$