

Figure 1: timing-pattern

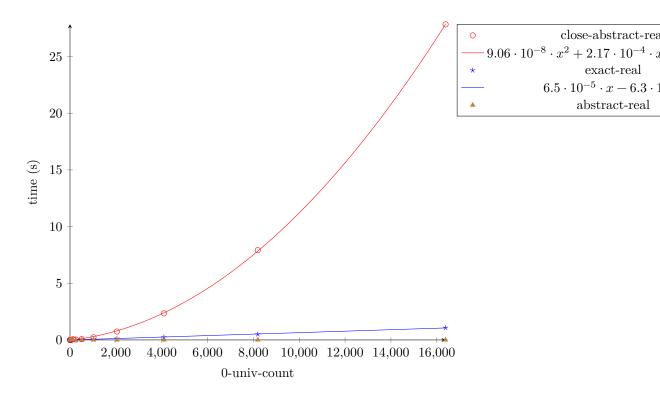


Figure 2: timing-n-polymorphic-universes param-1-n 0

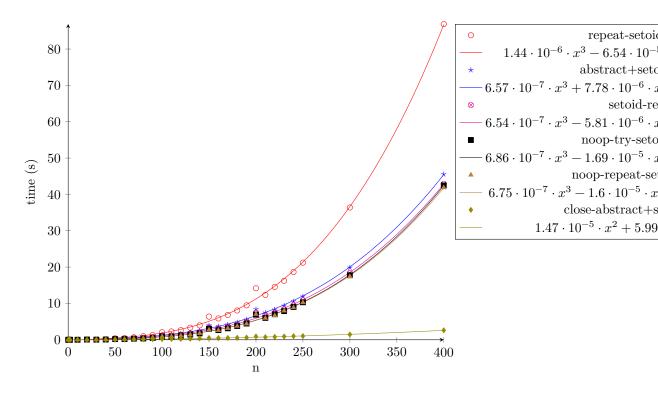


Figure 3: timing-repeat-setoid-rewrite-under-binders

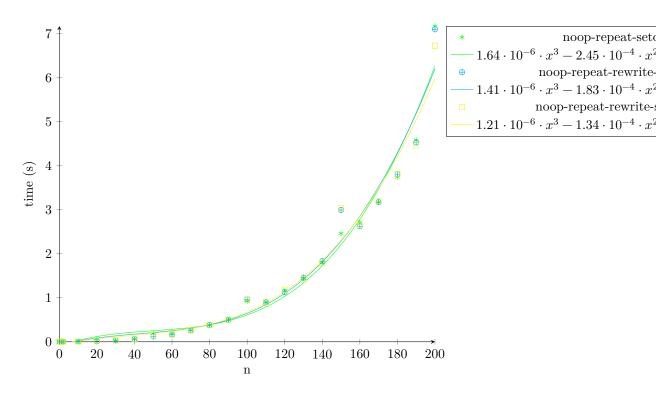
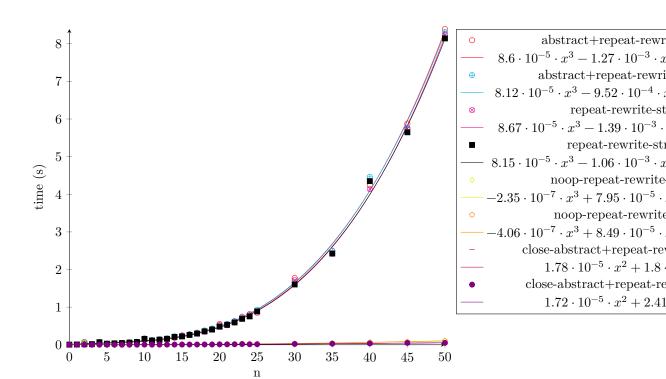


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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

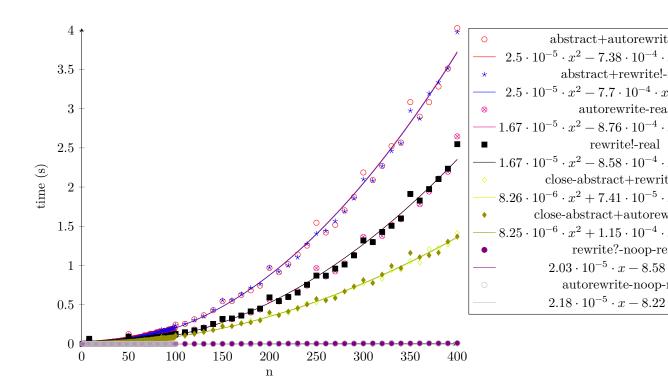


Figure 6: timing-rewrite-repeated-app-autorewrite

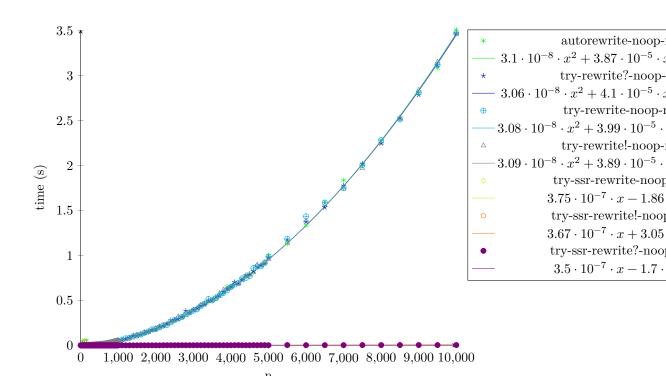
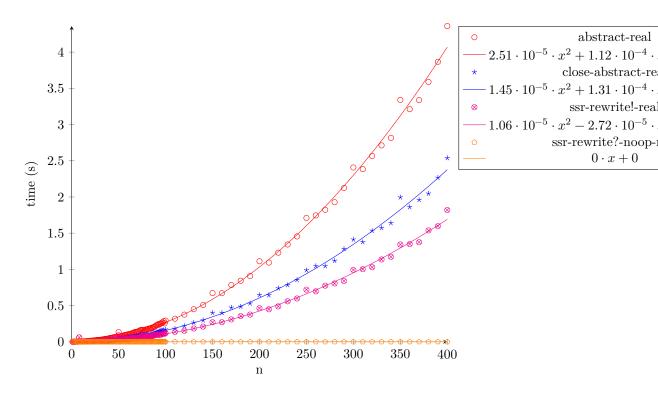
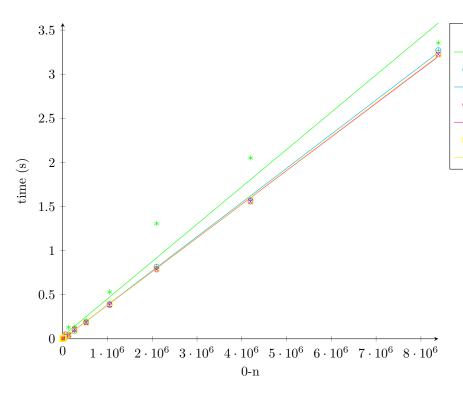


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

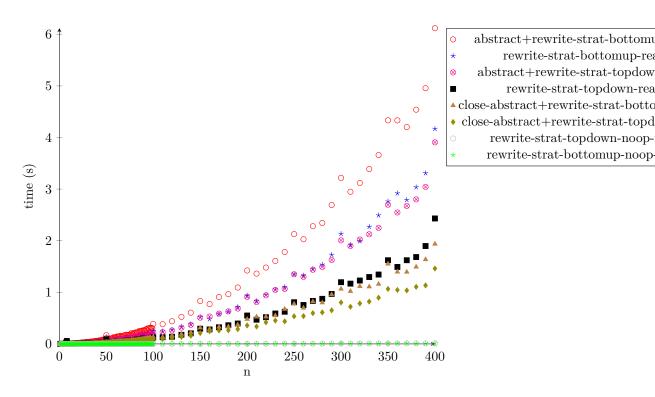


try-ssr-rewrite!-cold-noop-rea $4.23\cdot 10^{-7}\cdot x + 2.99\cdot 10^{-2}$ try-ssr-rewrite-noop-real

 $3.87 \cdot 10^{-7} \cdot x - 3.6 \cdot 10^{-3}$ try-ssr-rewrite!-noop-real

 $\begin{aligned} &3.82\cdot 10^{-7}\cdot x-1.98\cdot 10^{-3}\\ &\text{try-ssr-rewrite?-noop-real}\\ &3.83\cdot 10^{-7}\cdot x-2.5\cdot 10^{-3} \end{aligned}$

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

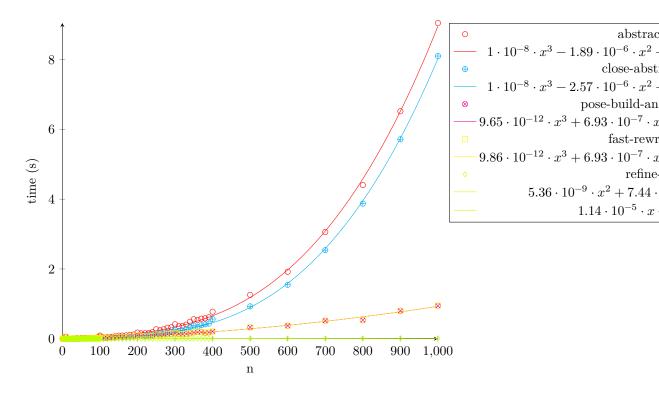


rewrite-strat-bottomup-rea abstract + rewrite - strat - topdow

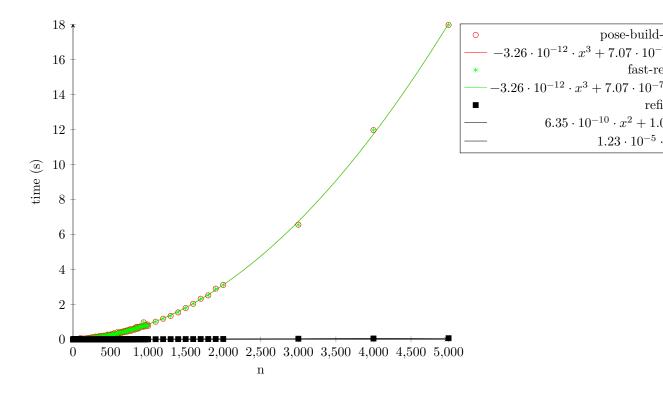
rewrite-strat-topdown-rea

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

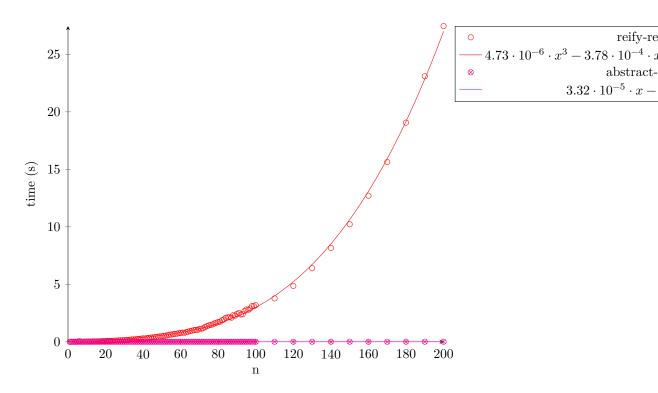


Figure 13: timing-typeclass-reification-let-in-HOAS

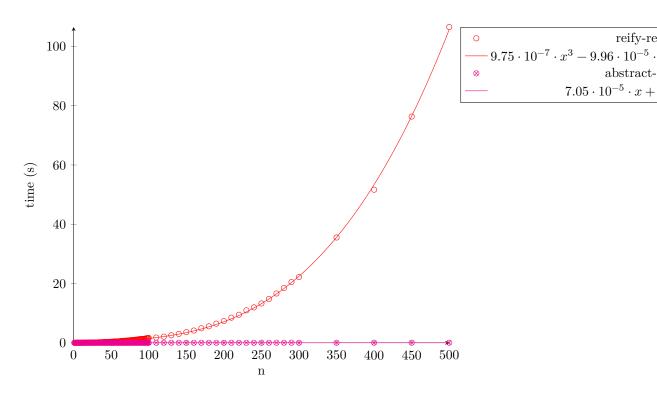
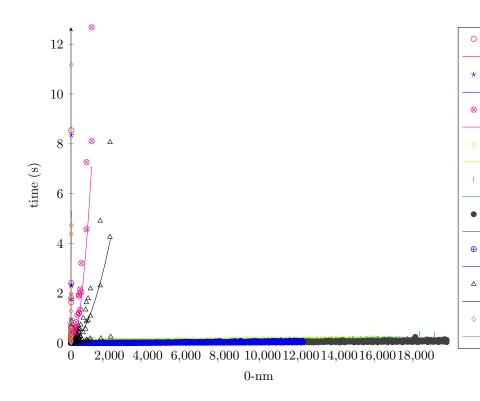


Figure 14: timing-typeclass-reification-let-in-PHOAS



rewrite-strat(bottomup-bot

 $6.21\cdot 10^{-6}\cdot x^2 - 9.36\cdot 10^{-5}\cdot x^2 + 3.36\cdot 1$

 $7.67 \cdot 10^{-11} \cdot x^2 + 4.29 \cdot 10^{-6} \cdot$

 $1.88 \cdot 10^{-10} \cdot x^2 + 3.64 \cdot 10^{-6} \cdot$

 $8.93 \cdot 10^{-11} \cdot x^2 + 2.84 \cdot 10^{-6} \cdot$

 $1.28\cdot 10^{-10}\cdot x^2 + 3.68\cdot 10^{-6}\cdot$

 $8.16 \cdot 10^{-7} \cdot x^2 + 3.53 \cdot 10^{-4} \cdot x^2$

 $-6.52 \cdot 10^{-3} \cdot x^3 + 0.21 \cdot x^2 - \\$

 $3.8\cdot 10^{-3}\exp{(0.48\cdot (0.48\cdot (0.48\cdot$

cps+native-compute

cps+cbn-real

cps+lazy-real

cps+cbv-real

cps+simpl-real

setoid-rewrite-re

cps+vm-compute-

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

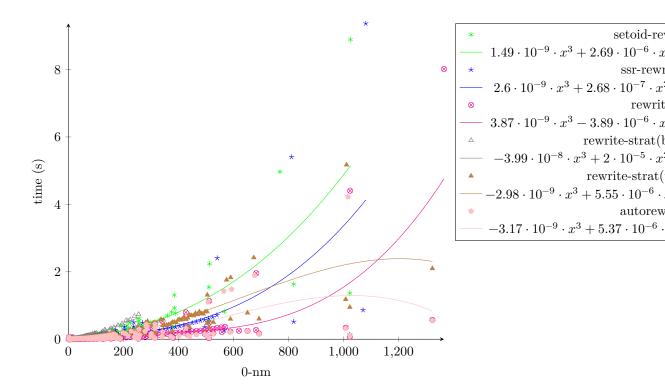
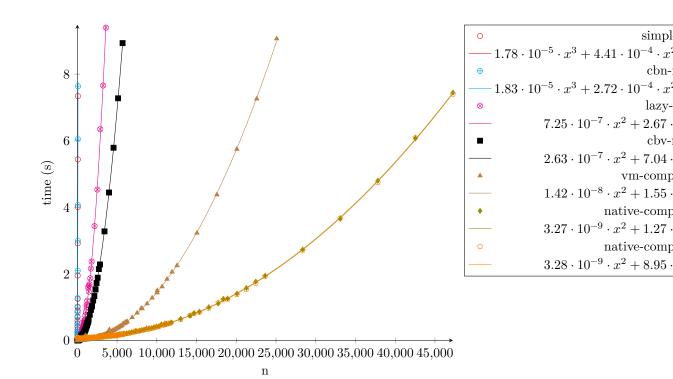
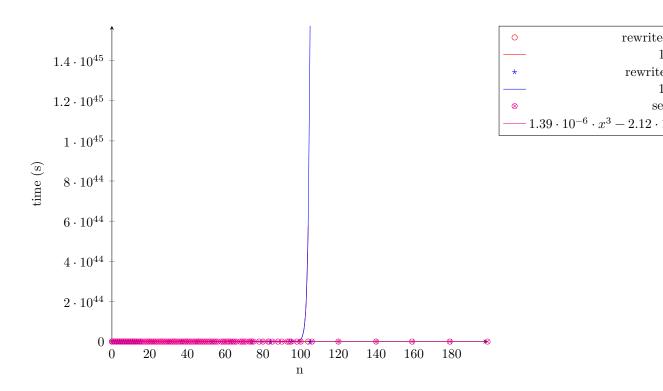


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



simpl

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



rewrite

rewrite

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