

Figure 1: timing-pattern

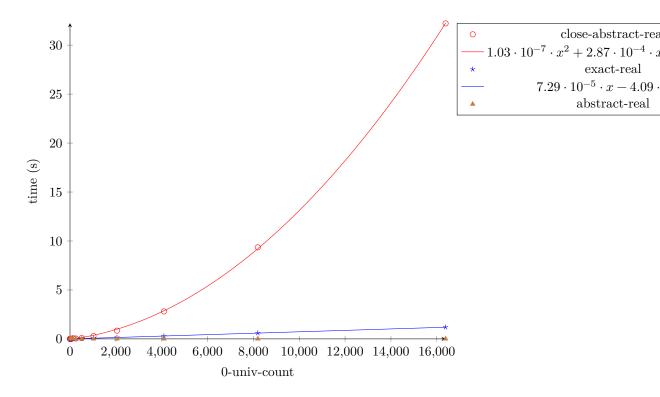
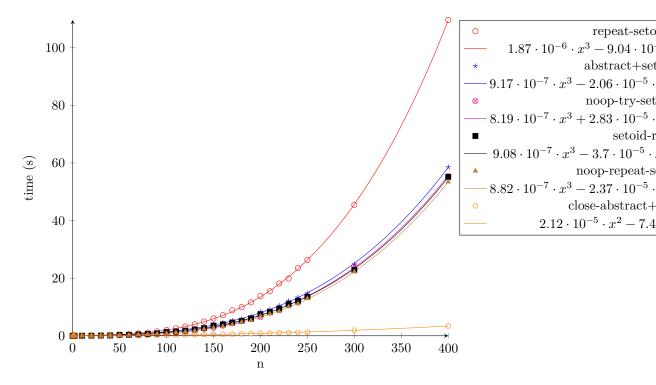
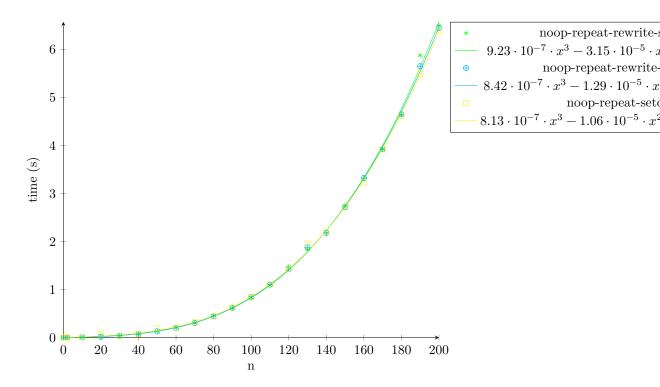


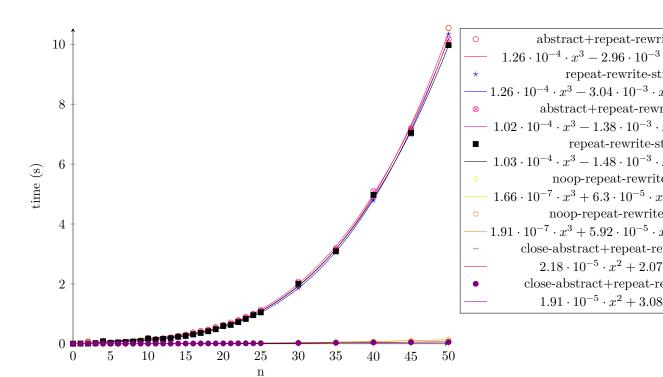
Figure 2: timing-n-polymorphic-universes param-1-n 0



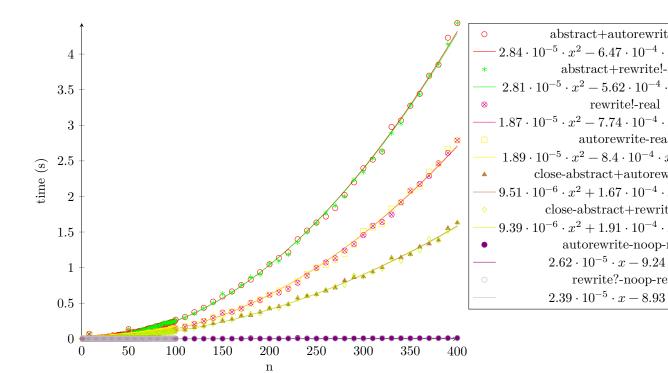
 $Figure \ 3: \ timing-repeat-setoid-rewrite-under-binders$



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



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



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

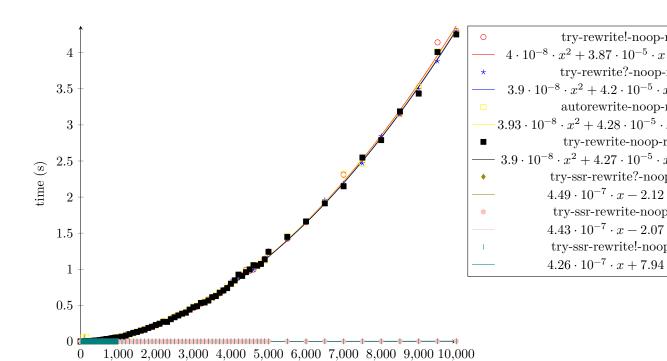
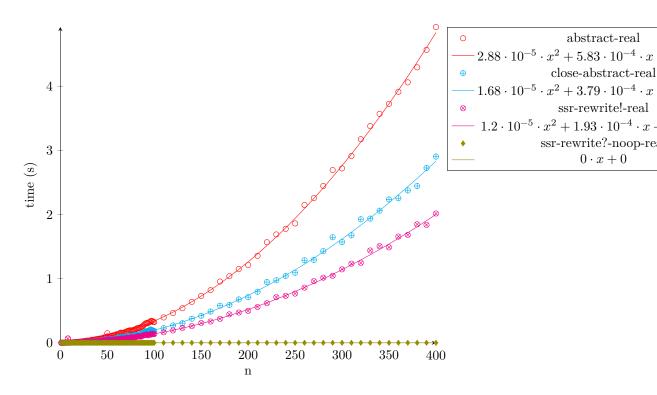
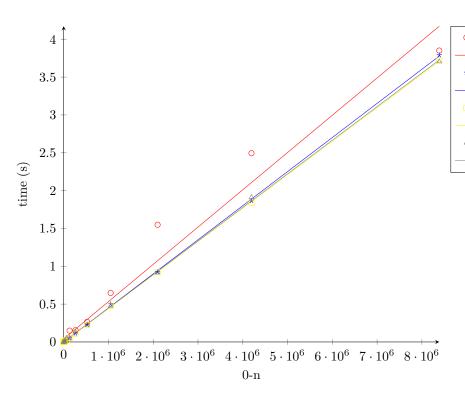


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

n



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



try-ssr-rewrite!-cold-noop-rea

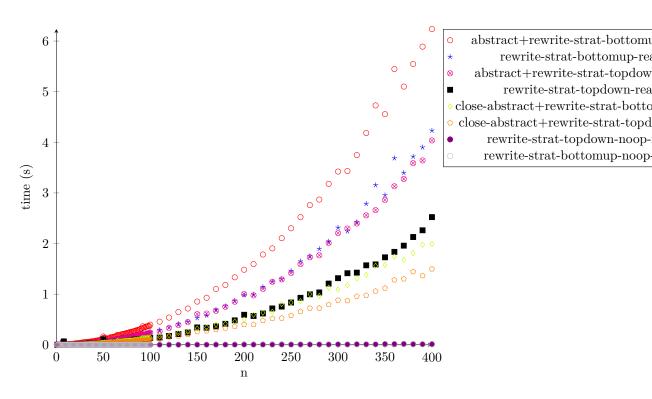
 $4.93 \cdot 10^{-7} \cdot x + 4.09 \cdot 10^{-2}$ try-ssr-rewrite?-noop-real

 $\begin{array}{l} 4.51\cdot 10^{-7}\cdot x - 1.38\cdot 10^{-3} \\ \text{try-ssr-rewrite-noop-real} \end{array}$

 $\begin{array}{l} 4.43 \cdot 10^{-7} \cdot x - 1.18 \cdot 10^{-3} \\ \text{try-ssr-rewrite!-noop-real} \end{array}$

 $4.44\cdot 10^{-7}\cdot x + 2.29\cdot 10^{-3}$

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

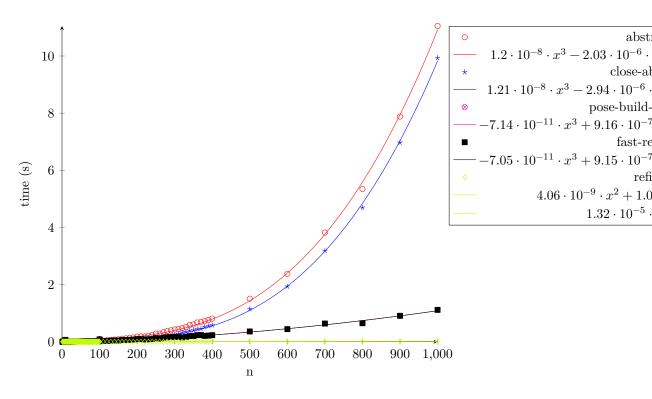


rewrite-strat-bottomup-rea abstract + rewrite - strat - topdowrewrite-strat-topdown-rea

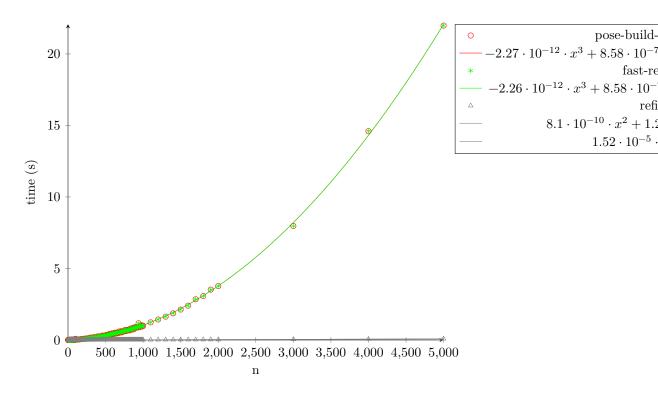
rewrite-strat-topdown-noop-

rewrite-strat-bottomup-noop-

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



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



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

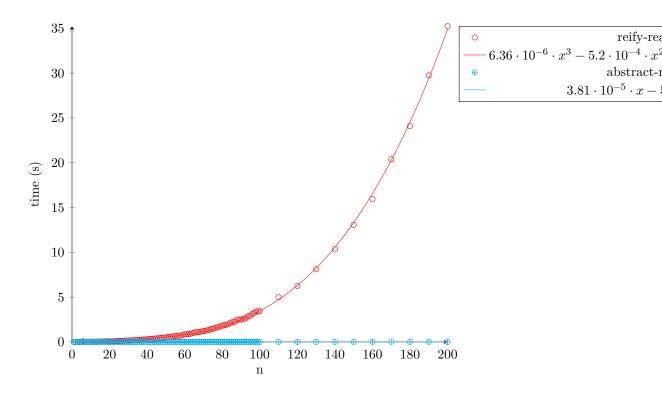


Figure 13: timing-typeclass-reification-let-in-HOAS

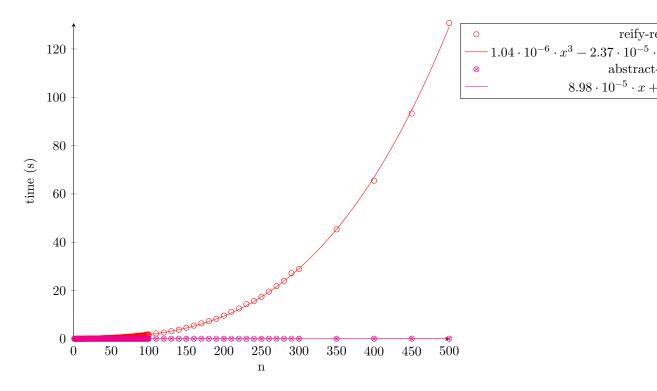


Figure 14: timing-typeclass-reification-let-in-PHOAS

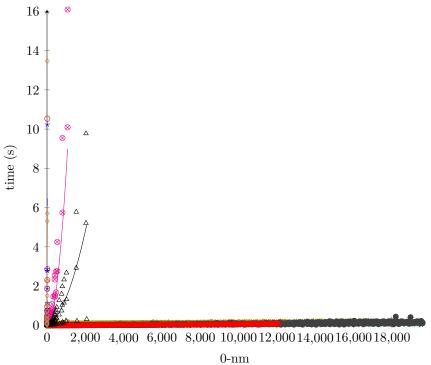


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

rewrite-strat(bottomup-bot $6.44 \cdot 10^{-3} exp (0.46 \cdot ($ rewrite-strat(topdown-bot $7.59 \cdot 10^{-3} exp (0.45 \cdot ($ cps+cbn-real $7.75 \cdot 10^{-6} \cdot x^2 + 1.31 \cdot 10^{-5} \cdot x^2$ cps+native-compute $1.37 \cdot 10^{-10} \cdot x^2 + 4.49 \cdot 10^{-6} \cdot$ cps+cbv-real $9.45 \cdot 10^{-11} \cdot x^2 + 3.75 \cdot 10^{-6} \cdot$ cps+lazy-real $2.2 \cdot 10^{-10} \cdot x^2 + 4.56 \cdot 10^{-6} \cdot x^2$ cps+vm-compute- $2.06 \cdot 10^{-10} \cdot x^2 + 4.15 \cdot 10^{-6} \cdot$ cps+simpl-real $9.73 \cdot 10^{-7} \cdot x^2 + 4.67 \cdot 10^{-4} \cdot x^2 + 4.67 \cdot 10^{-4}$ setoid-rewrite-re $-7.87 \cdot 10^{-3} \cdot x^3 + 0.25 \cdot x^2 -$

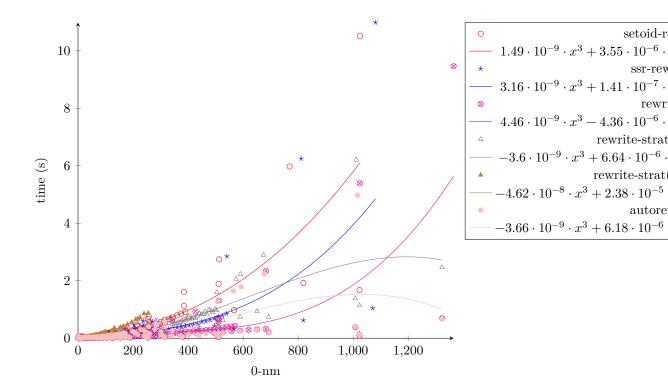
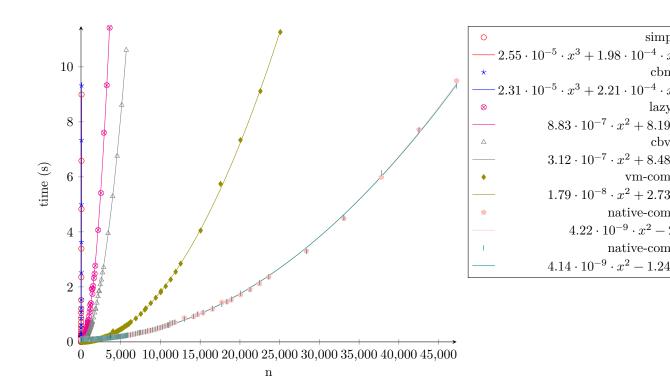


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



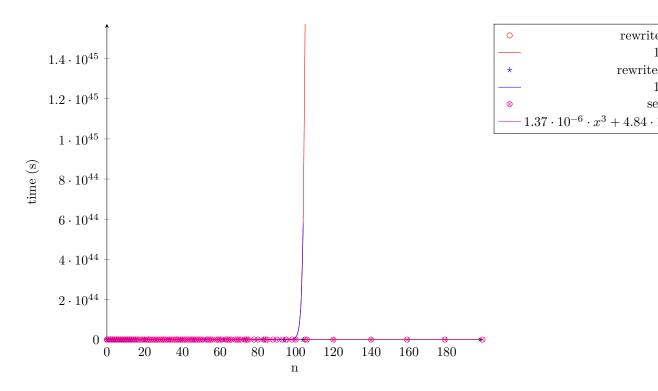
simp

vm-com

native-com

native-com

Figure 17: timing-sieve-of-eratosthenes



rewrite

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