

Figure 1: timing-pattern

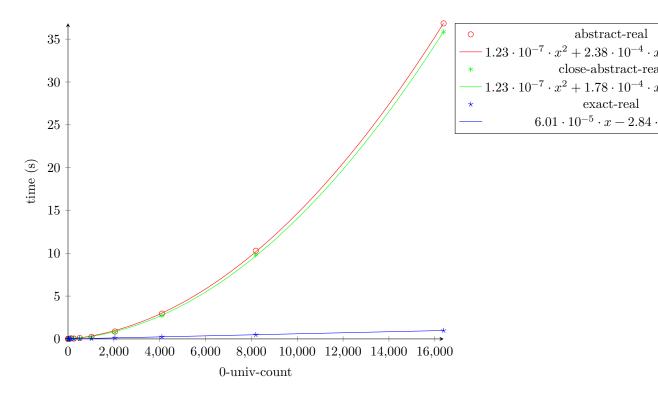
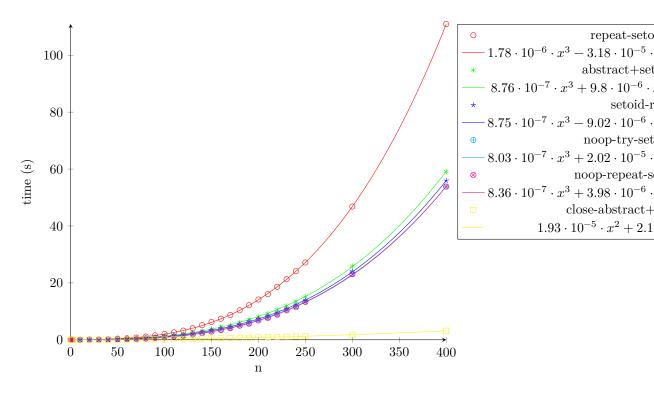
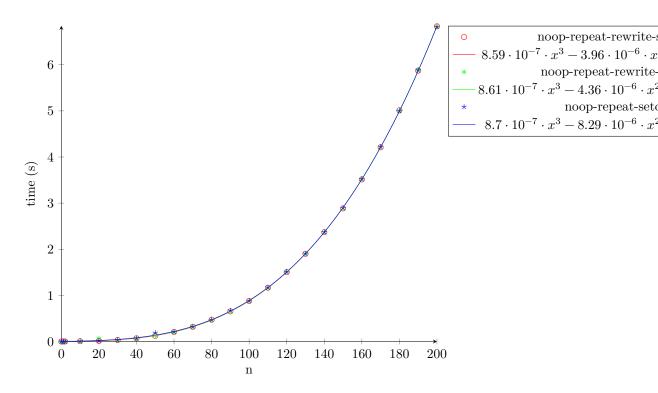


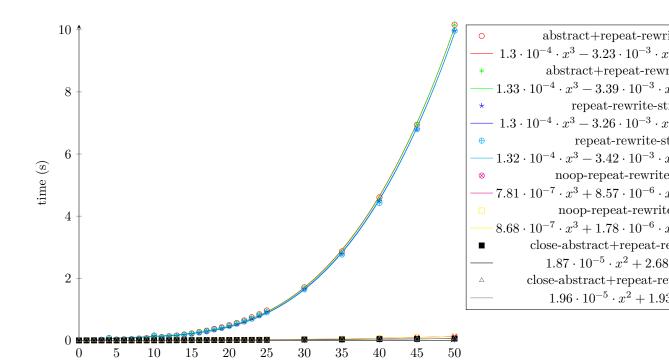
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



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

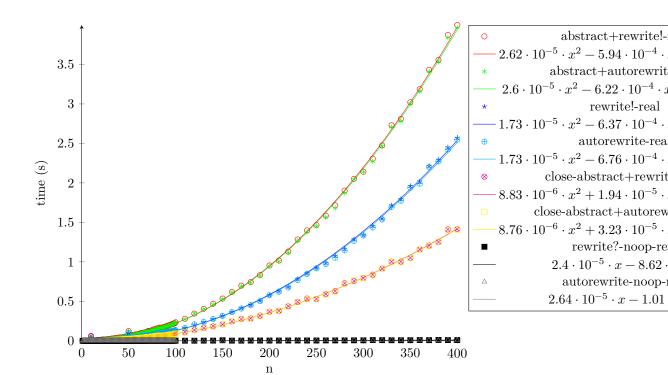


 $Figure\ 4:\ timing-repeat-setoid-rewrite-under-binders-noop$



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

 \mathbf{n}



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

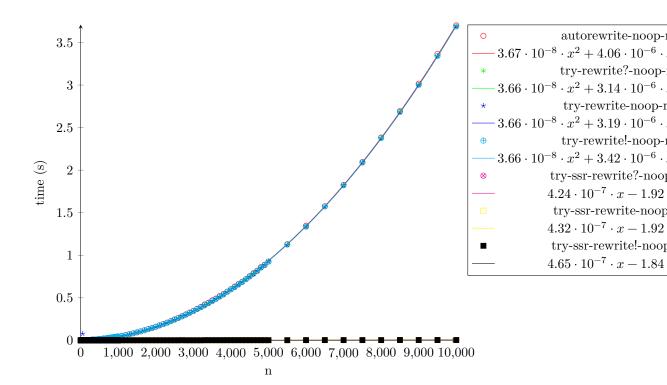
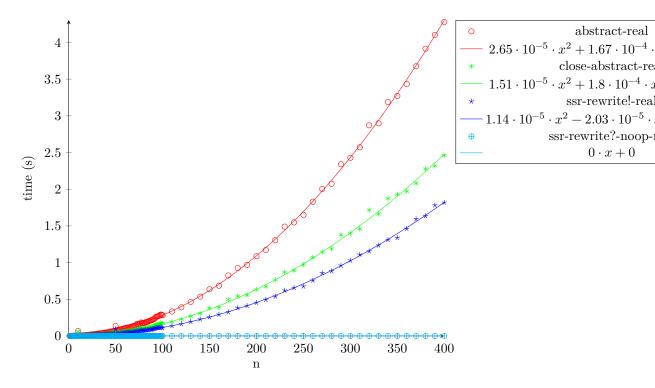
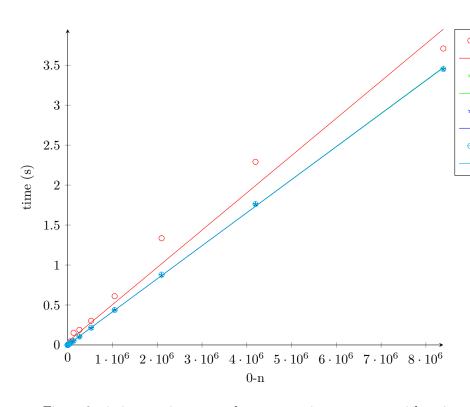


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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



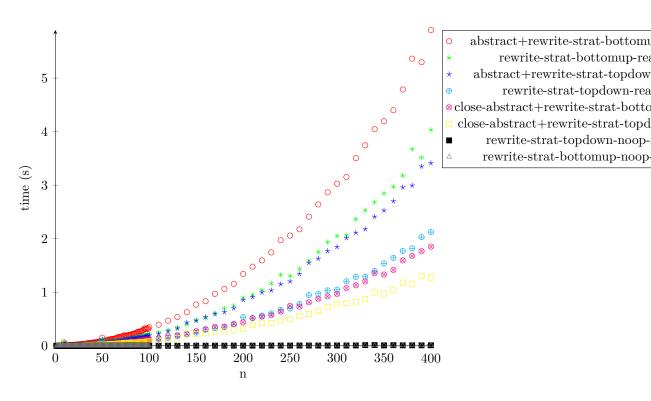
try-ssr-rewrite!-cold-noop-rea $4.66\cdot 10^{-7}\cdot x + 3.77\cdot 10^{-2}$

try-ssr-rewrite?-noop-real $4.14\cdot 10^{-7}\cdot x - 2.69\cdot 10^{-4}$

 $\begin{array}{l} \text{try-ssr-rewrite-noop-real} \\ 4.13 \cdot 10^{-7} \cdot x + 1.37 \cdot 10^{-3} \\ \text{try-ssr-rewrite!-noop-real} \end{array}$

 $4.13\cdot 10^{-7}\cdot x + 9.17\cdot 10^{-4}$

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

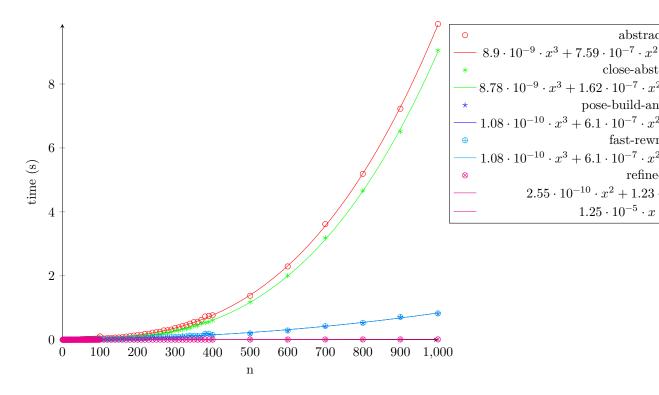


rewrite-strat-bottomup-rea

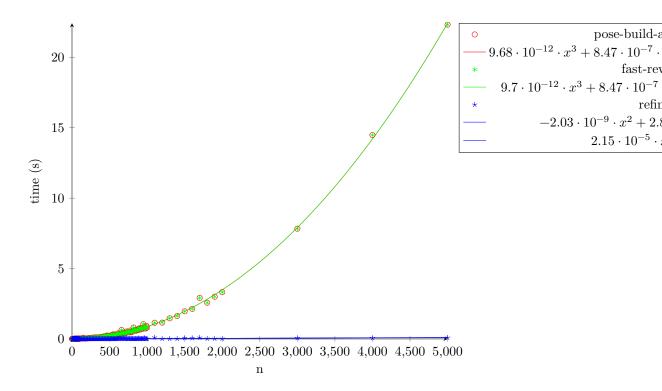
rewrite-strat-topdown-rea

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

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



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



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

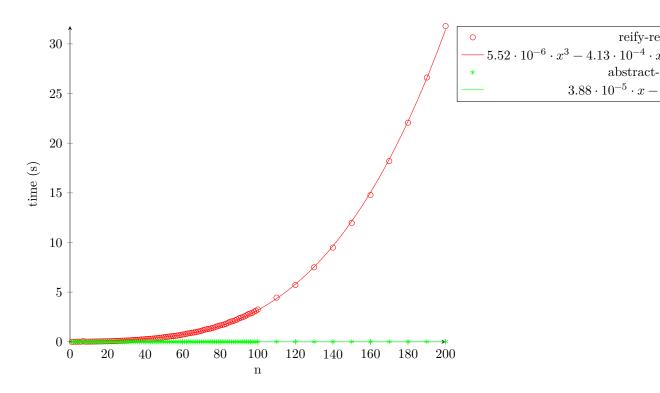
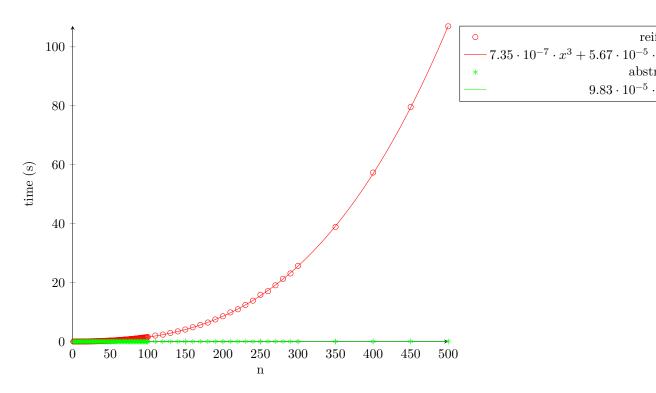


Figure 13: timing-typeclass-reification-let-in-HOAS



 ${\bf Figure~14:~timing-type class-reification-let-in-PHOAS}$

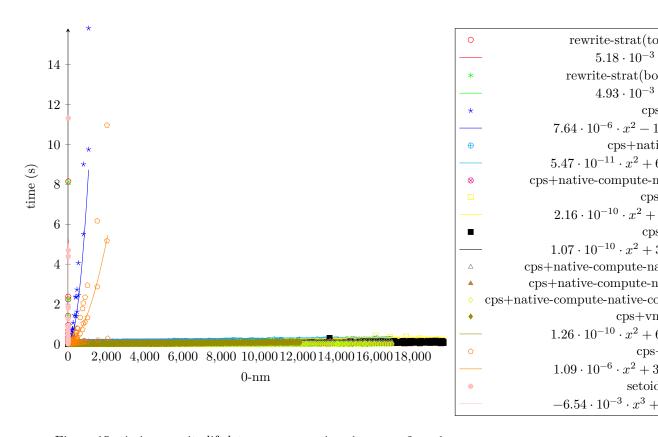


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1 $\,$

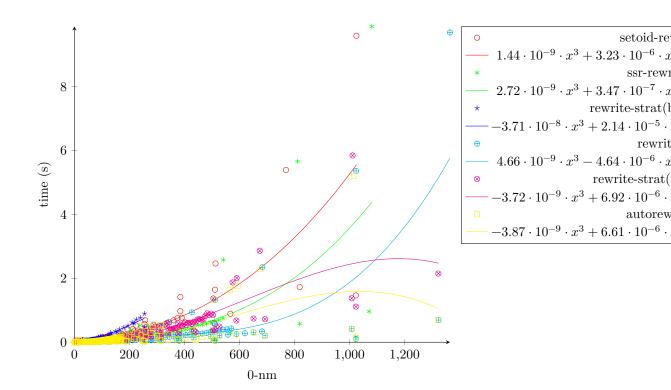


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1

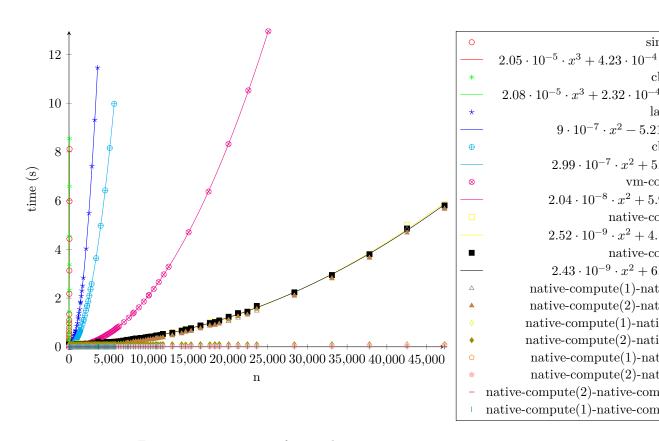
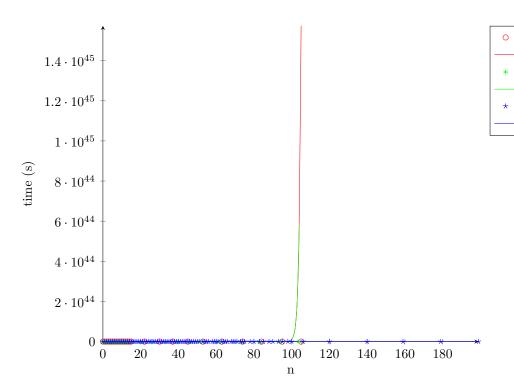


Figure 17: timing-sieve-of-eratosthenes



rewrite

rewrite-

 $-1.53 \cdot 10^{-6} \cdot x^3 + 2.39 \cdot 1$

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

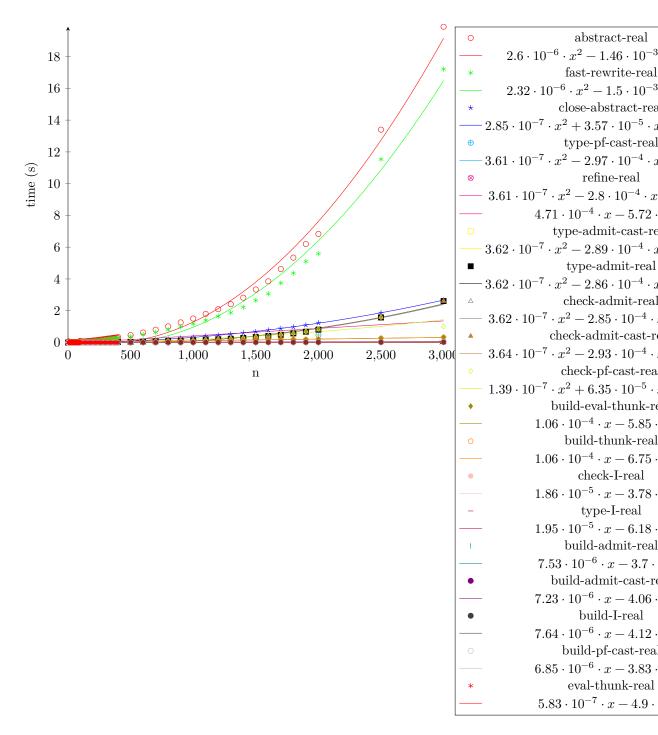


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2