

Figure 1: timing-pattern

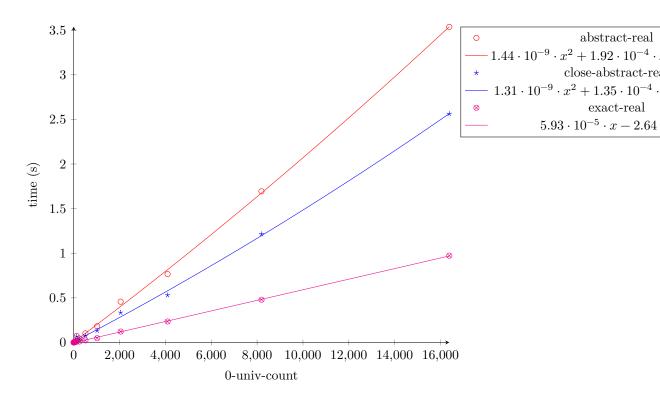


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

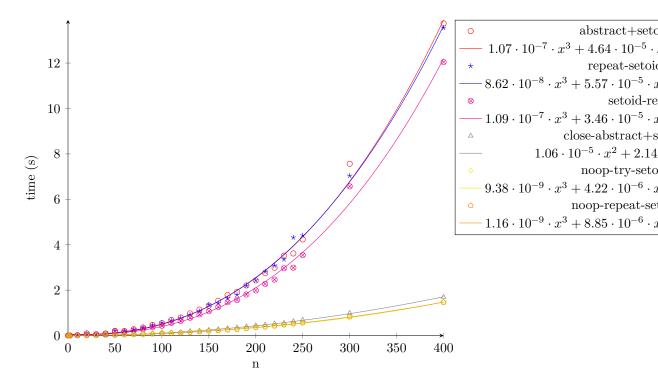


Figure 3: timing-repeat-setoid-rewrite-under-binders

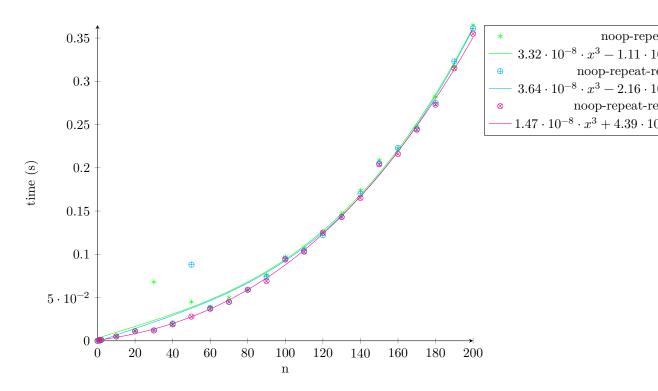
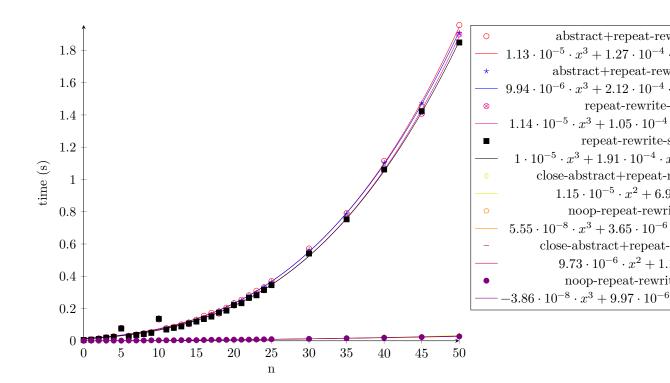
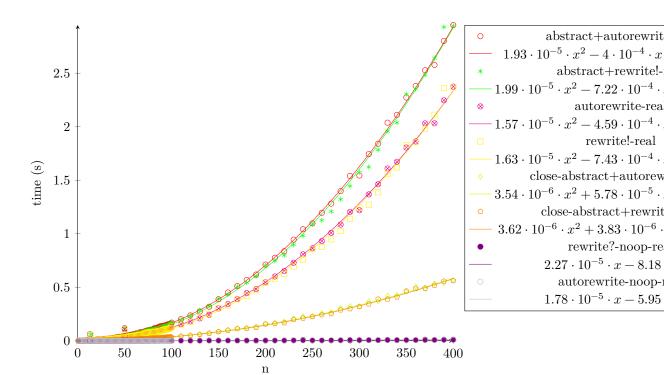


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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



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

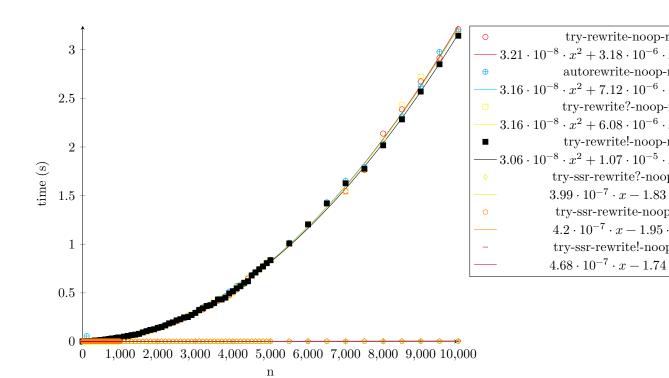
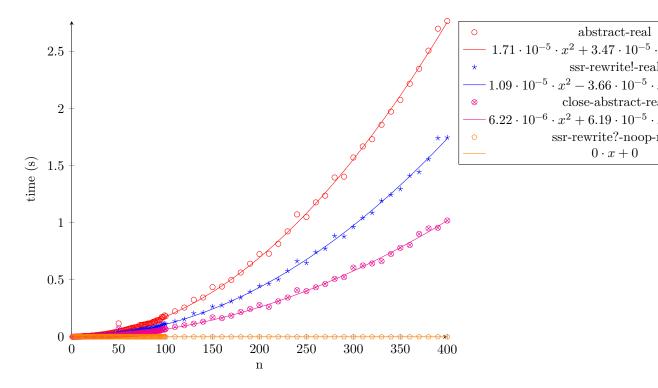
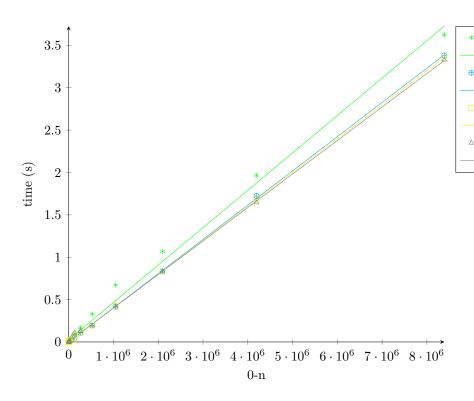


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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



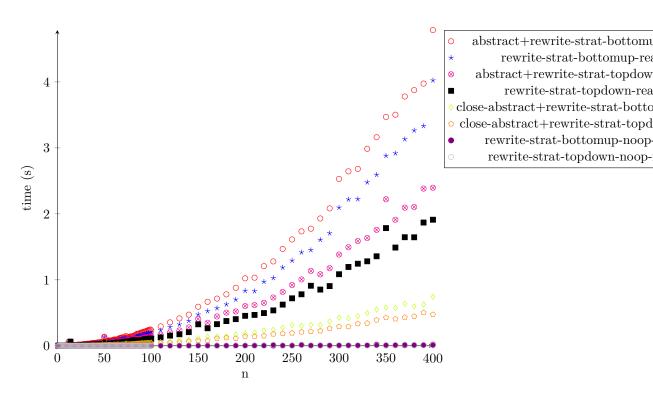
try-ssr-rewrite!-cold-noop-rea

 $\begin{array}{l} 4.41\cdot 10^{-7}\cdot x + 2.58\cdot 10^{-2}\\ \text{try-ssr-rewrite?-noop-real} \end{array}$ 

 $\begin{aligned} &4.04 \cdot 10^{-7} \cdot x - 1.05 \cdot 10^{-3} \\ &\text{try-ssr-rewrite-noop-real} \\ &4 \cdot 10^{-7} \cdot x - 6.65 \cdot 10^{-4} \end{aligned}$ 

try-ssr-rewrite!-noop-real  $3.95\cdot 10^{-7}\cdot x + 4.33\cdot 10^{-3}$ 

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



 $abstract + rewrite - strat - bottom \\ \\$ rewrite-strat-bottomup-rea abstract + rewrite - strat - topdow

rewrite-strat-topdown-rea

rewrite-strat-bottomup-noop-

rewrite-strat-topdown-noop-

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

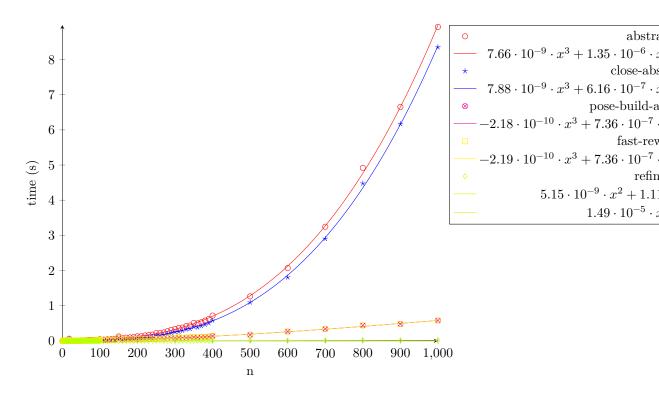
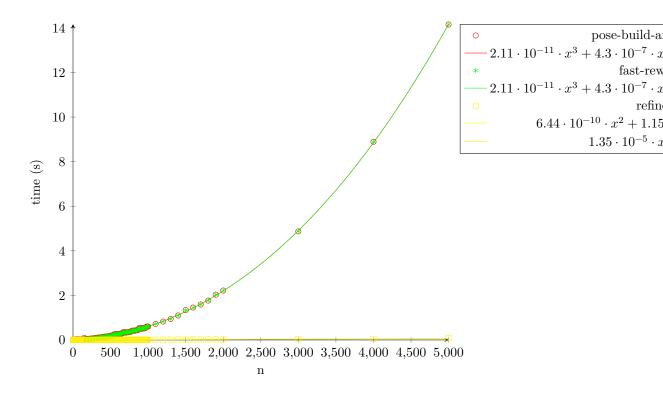
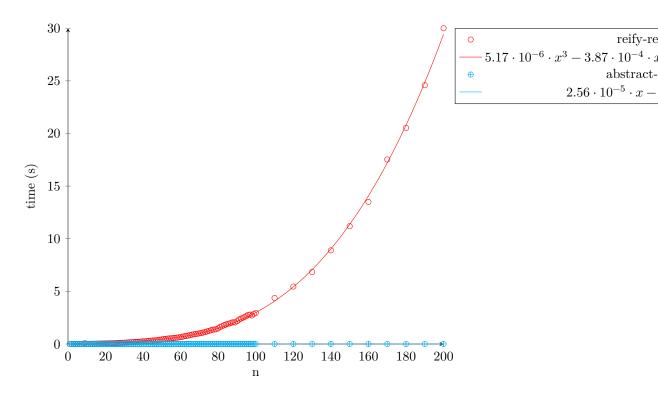


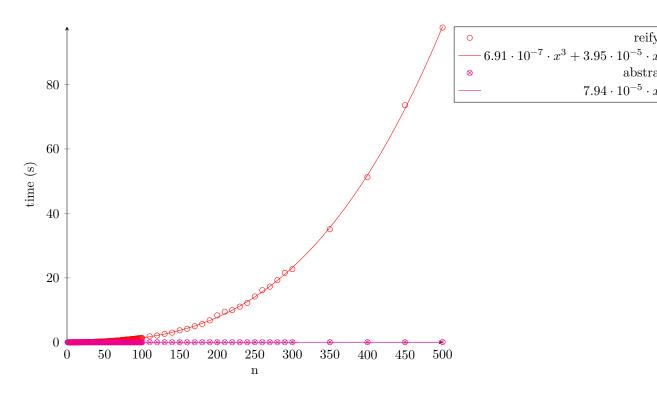
Figure 11: timing-rewrite-repeated-app-fast-rewrite



 $Figure \ 12: \ timing-rewrite-repeated-app-fast-rewrite-no-abstract$ 



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



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

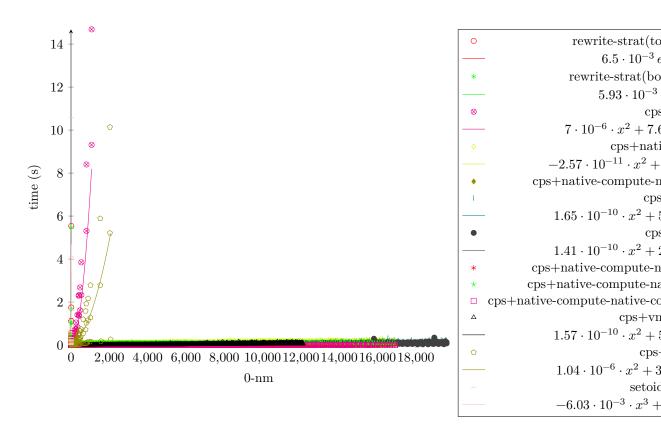


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1  $\,$ 

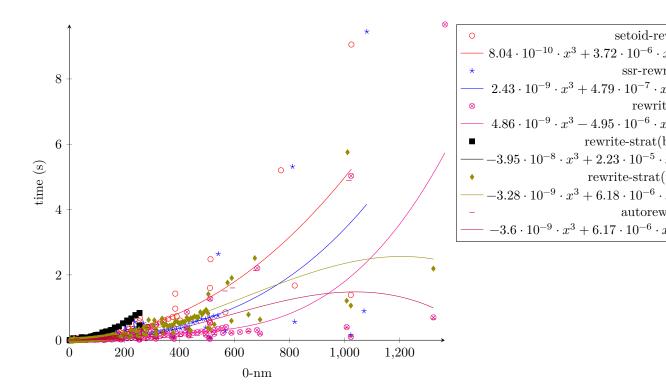


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1

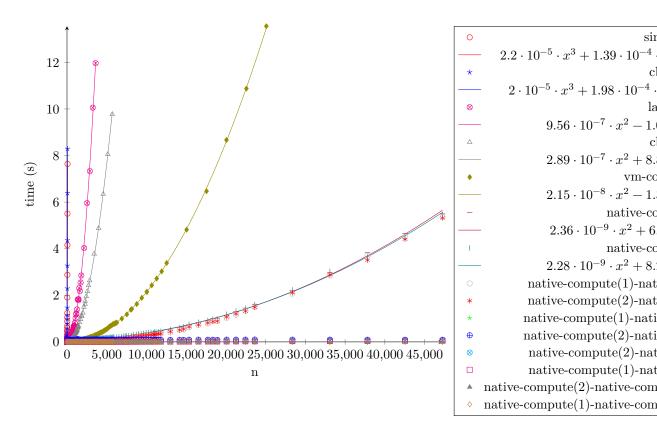
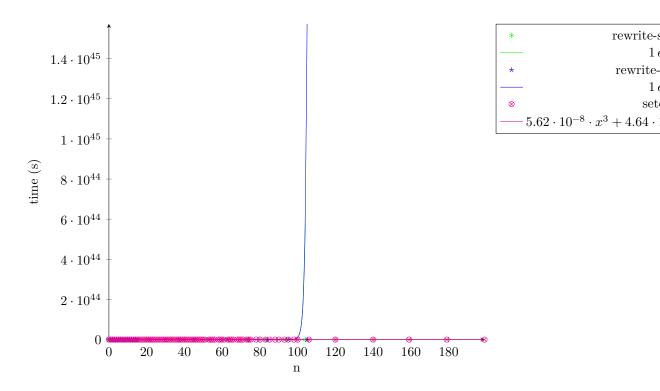


Figure 17: timing-sieve-of-eratosthenes



rewrite-

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

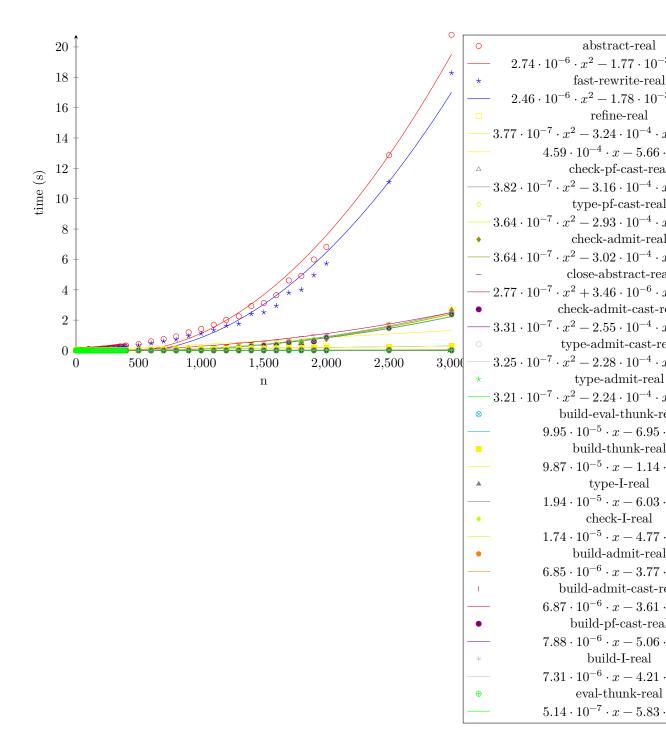


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2