

Figure 1: timing-pattern

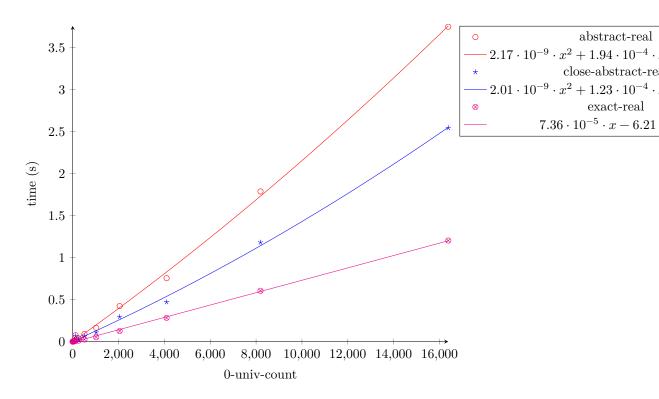
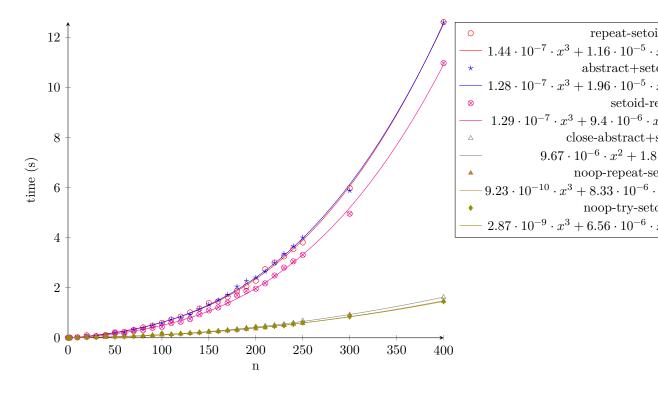
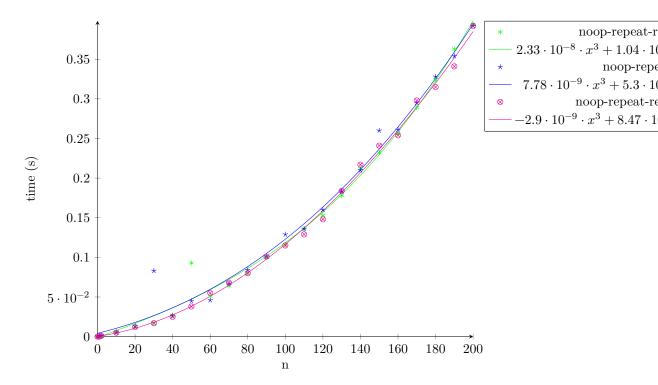


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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



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

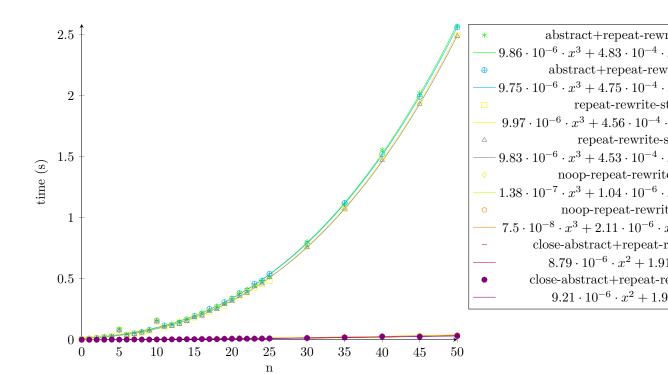
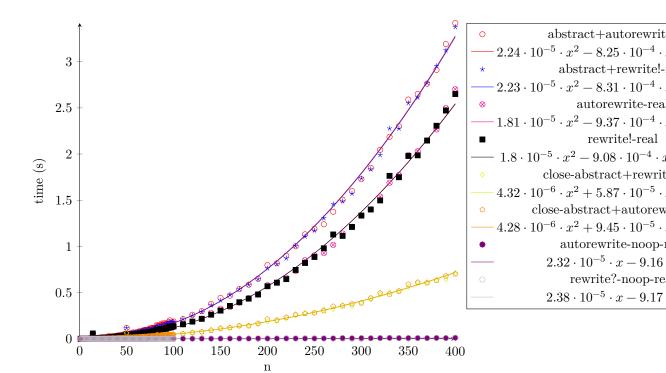
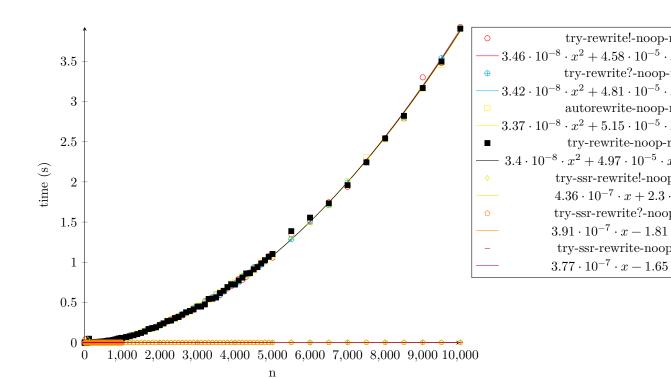


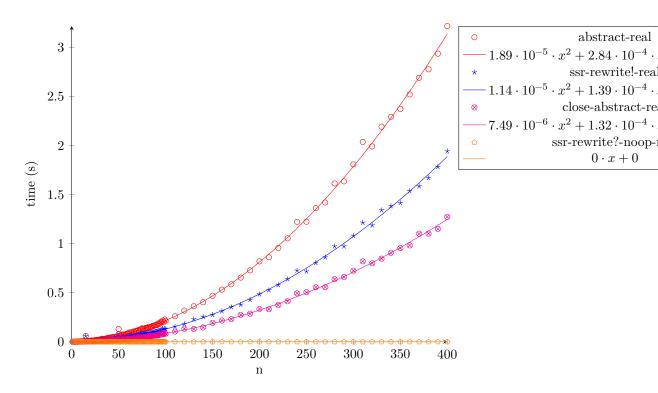
Figure 5: timing-rewrite-strat-under-binders



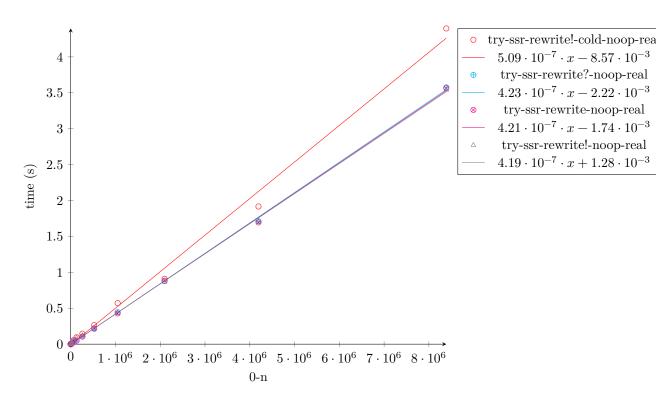
 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$ 



 $Figure~7:~timing\mbox{-rewrite-repeated-app-autorewrite-noop}$ 



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



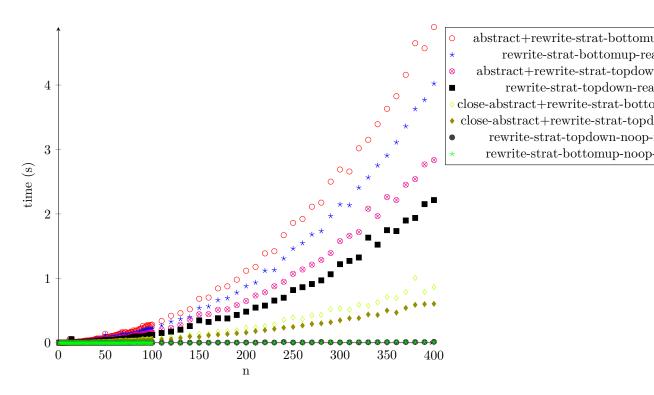
 $5.09 \cdot 10^{-7} \cdot x - 8.57 \cdot 10^{-3}$ 

try-ssr-rewrite?-noop-real  $4.23\cdot 10^{-7}\cdot x - 2.22\cdot 10^{-3}$ 

try-ssr-rewrite-noop-real $4.21 \cdot 10^{-7} \cdot x - 1.74 \cdot 10^{-3}$ 

try-ssr-rewrite!-noop-real  $4.19\cdot 10^{-7}\cdot x + 1.28\cdot 10^{-3}$ 

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



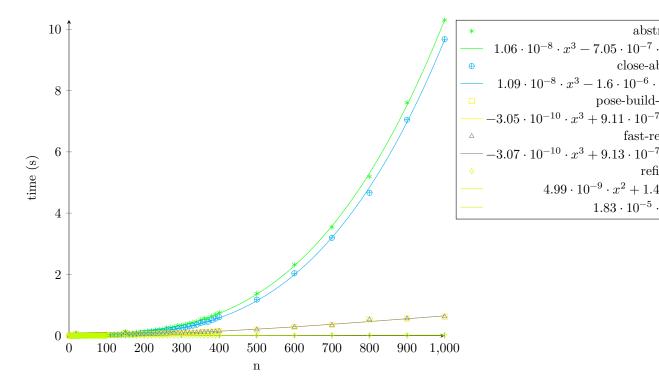
rewrite-strat-bottomup-rea

rewrite-strat-topdown-rea

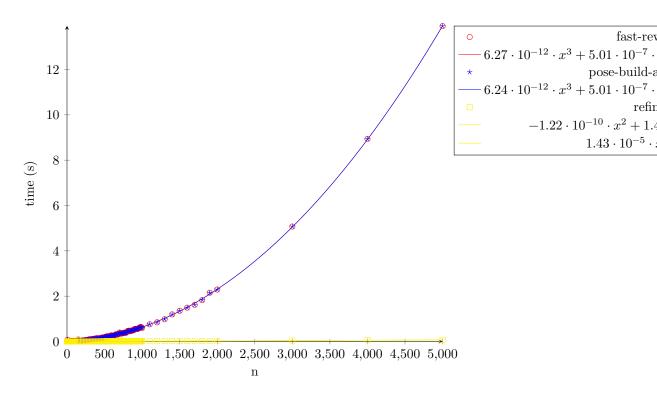
rewrite-strat-topdown-noop-

rewrite-strat-bottomup-noop-

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



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



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

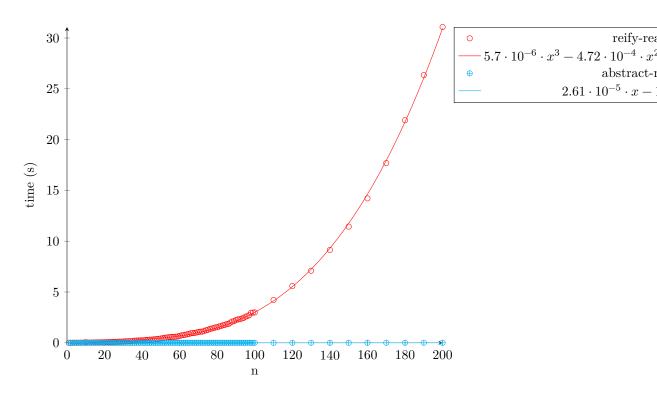


Figure 13: timing-typeclass-reification-let-in-HOAS

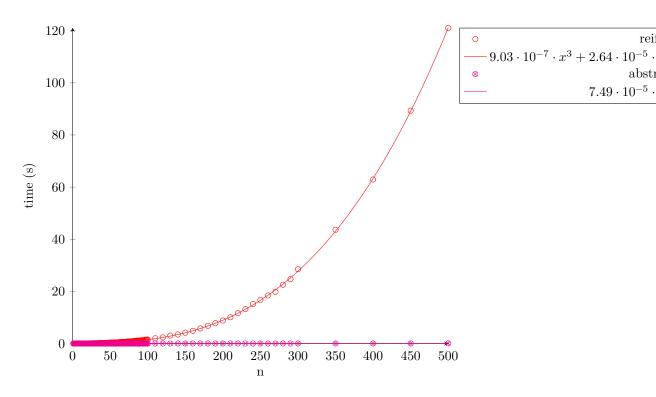


Figure 14: timing-typeclass-reification-let-in-PHOAS

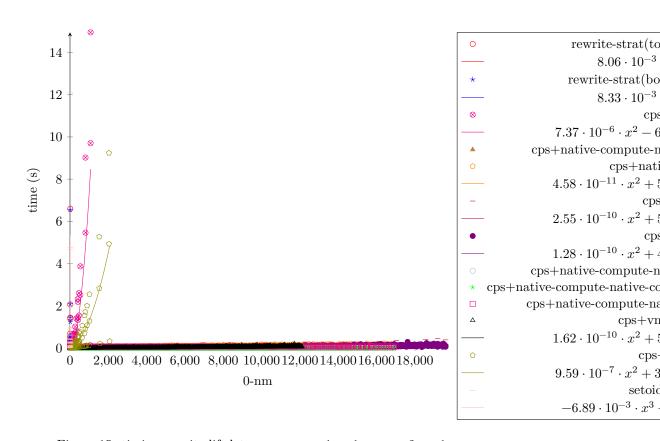


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1  $\,$ 

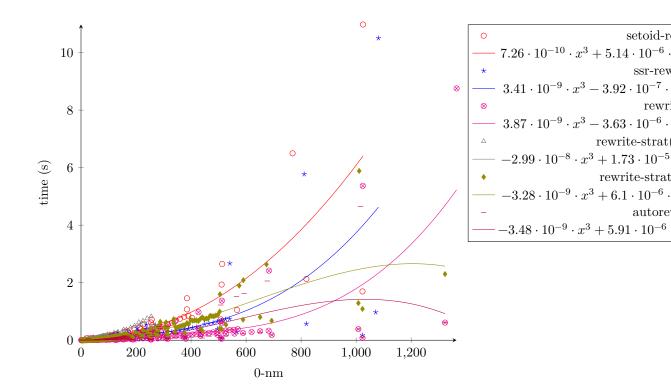


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1

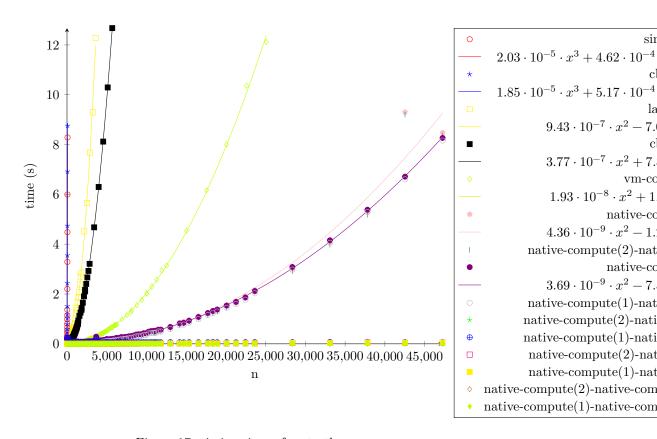
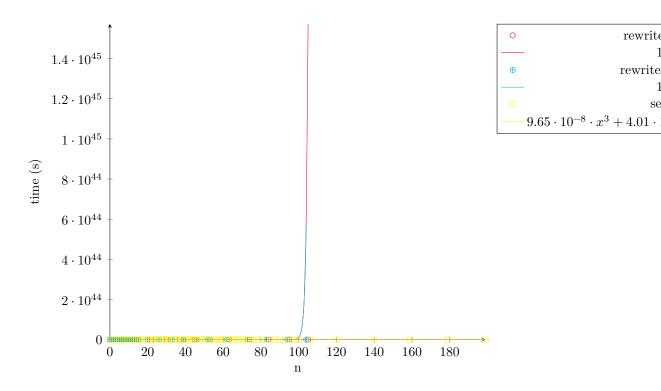


Figure 17: timing-sieve-of-eratosthenes



rewrite

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

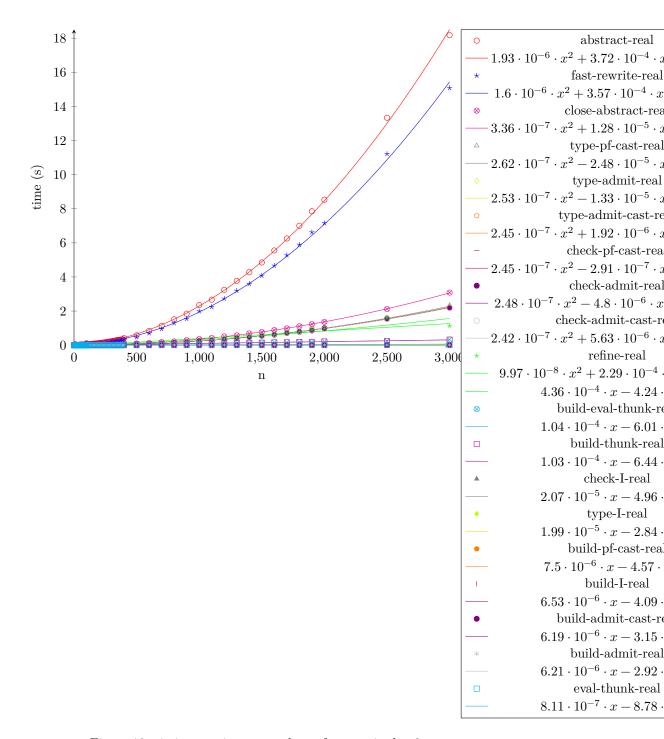


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2