

Figure 1: timing-pattern

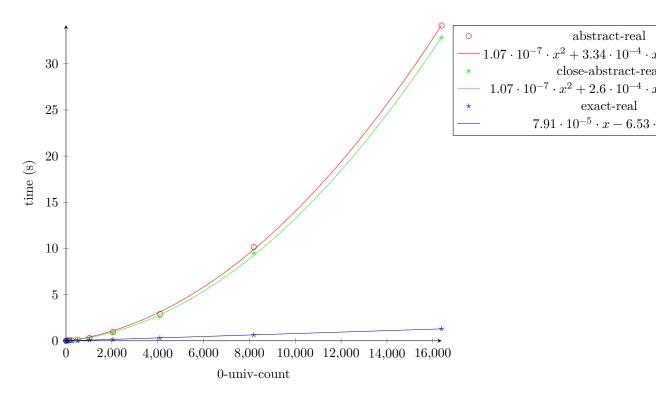
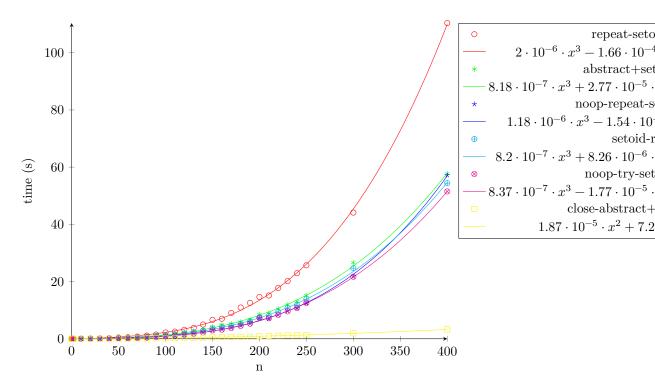
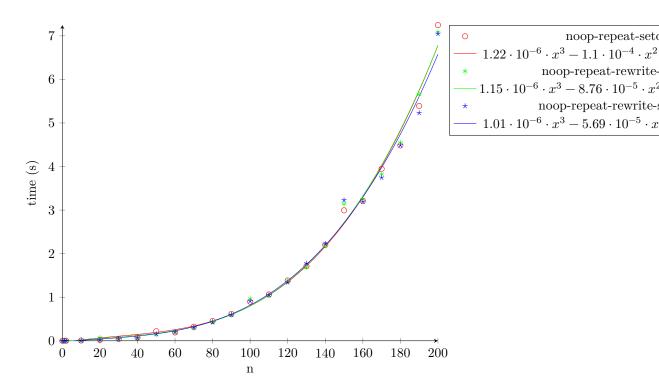


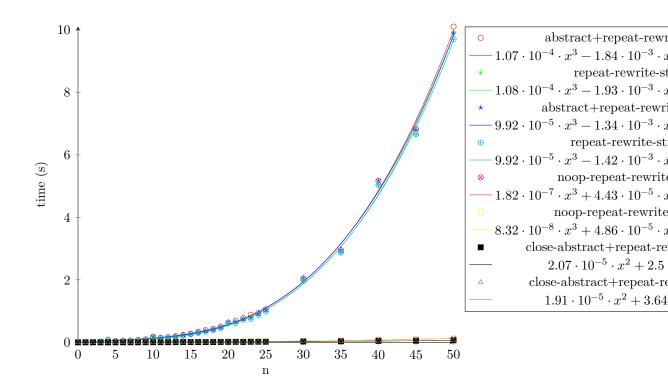
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



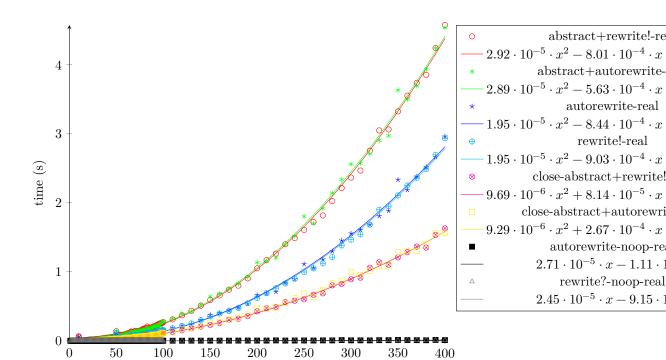
 $Figure \ 3: \ timing-repeat-setoid-rewrite-under-binders$



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

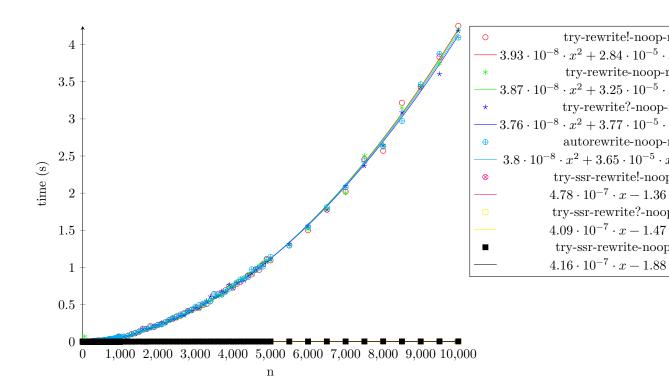


 $Figure\ 5:\ timing-rewrite-strat-under-binders$



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

n



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

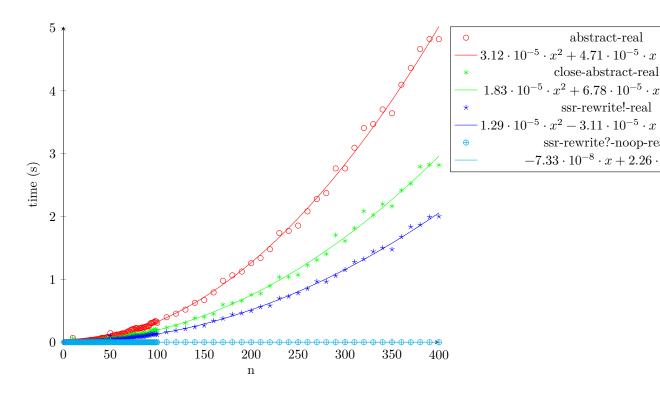
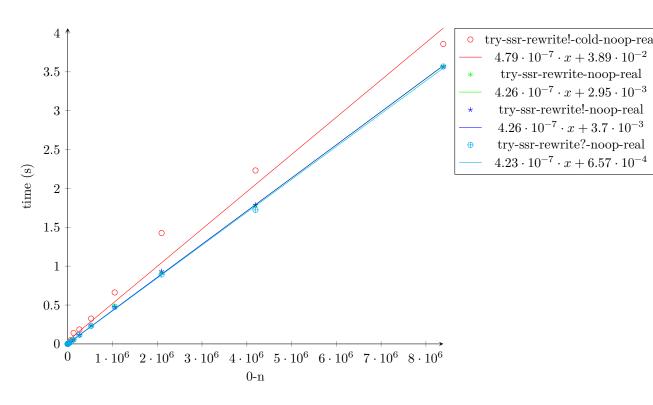


Figure 8: timing-rewrite-repeated-app-ssrrewrite



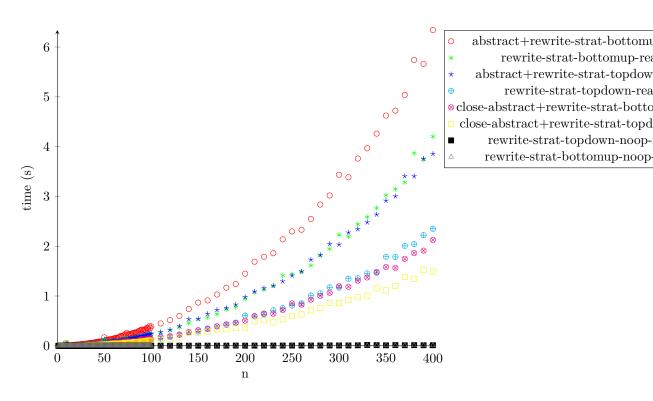
 $4.79 \cdot 10^{-7} \cdot x + 3.89 \cdot 10^{-2}$

try-ssr-rewrite-noop-real $4.26\cdot 10^{-7}\cdot x + 2.95\cdot 10^{-3}$

try-ssr-rewrite!-noop-real $4.26\cdot 10^{-7}\cdot x + 3.7\cdot 10^{-3}$ try-ssr-rewrite?-noop-real

 $4.23 \cdot 10^{-7} \cdot x + 6.57 \cdot 10^{-4}$

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

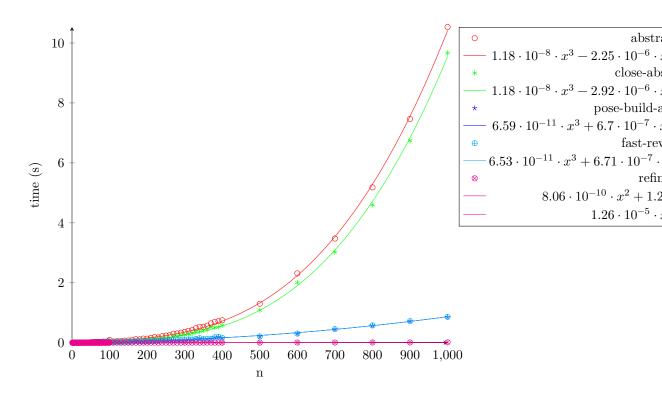


rewrite-strat-bottomup-rea abstract + rewrite - strat - topdowrewrite-strat-topdown-rea

rewrite-strat-topdown-noop-

rewrite-strat-bottomup-noop-

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



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

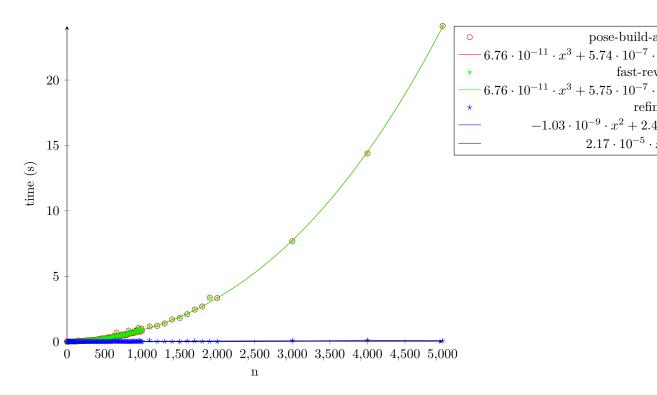


Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract

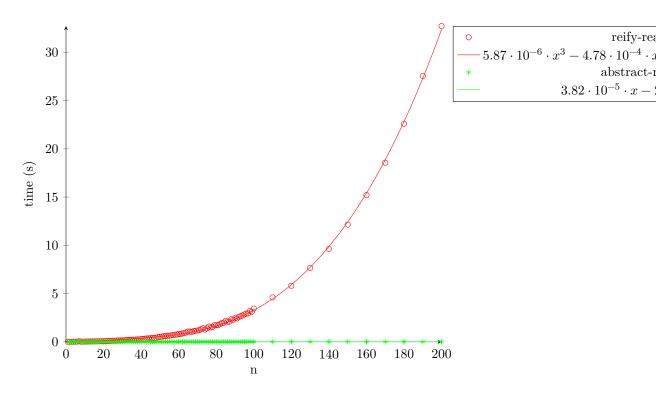
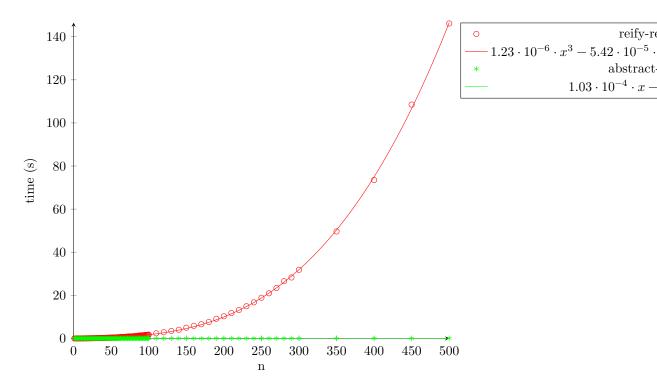


Figure 13: timing-typeclass-reification-let-in-HOAS



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

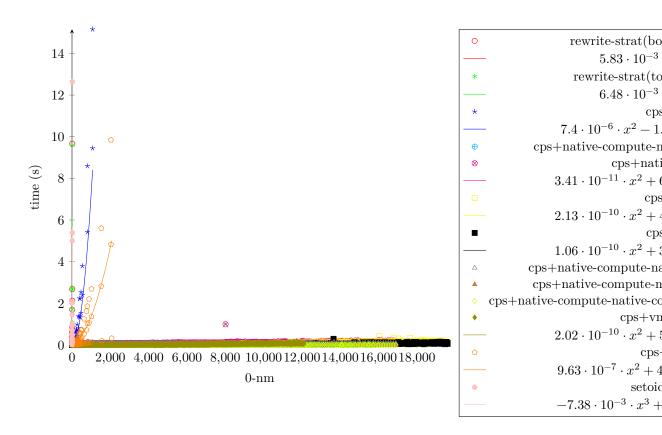


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1 $\,$

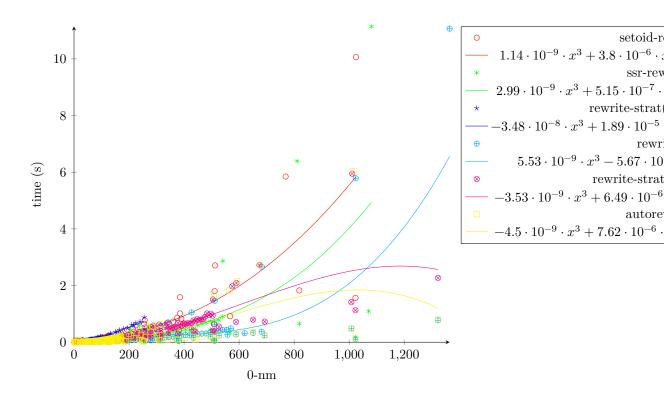


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1

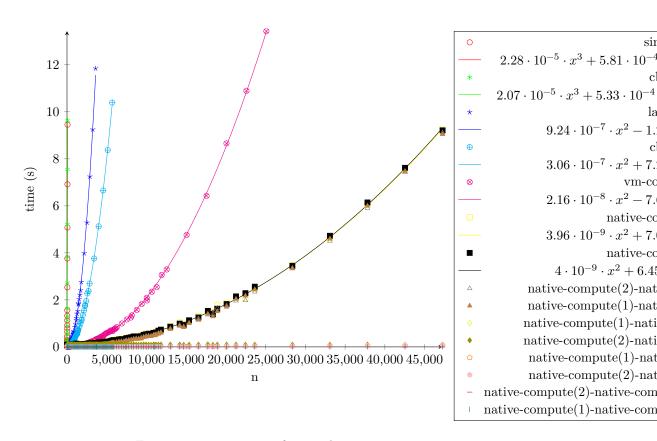
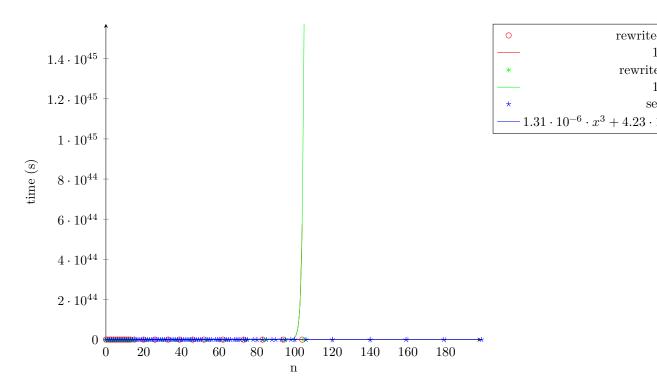


Figure 17: timing-sieve-of-eratosthenes



rewrite

rewrite

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

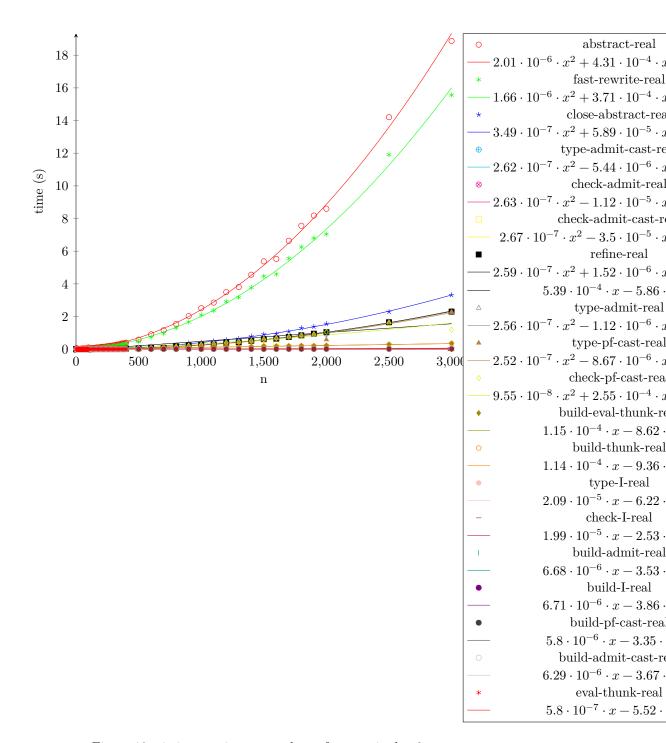


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2