

Figure 1: timing-pattern

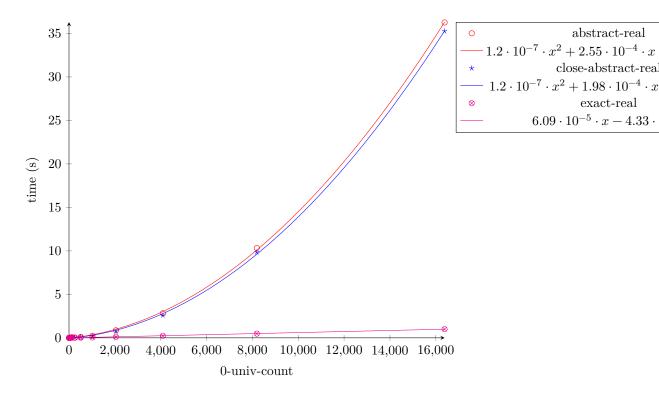
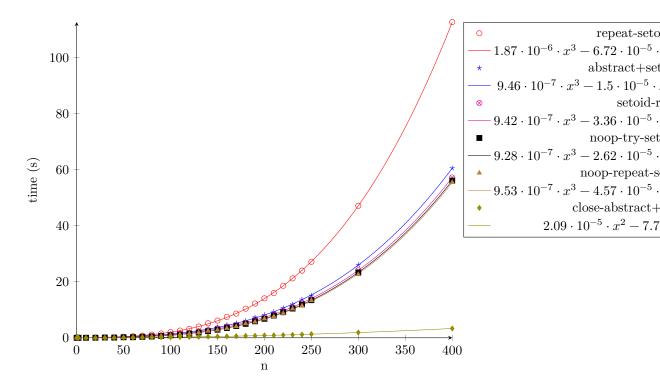
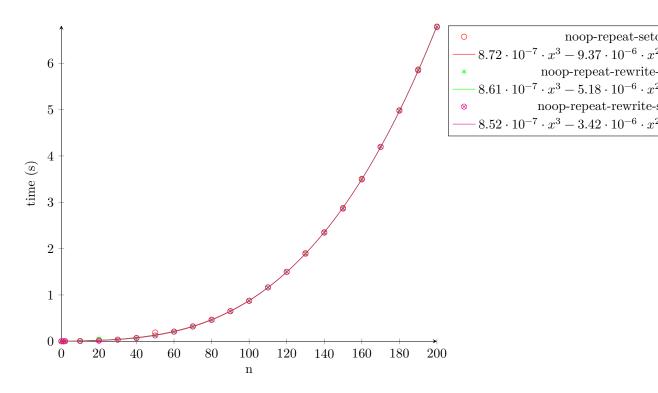


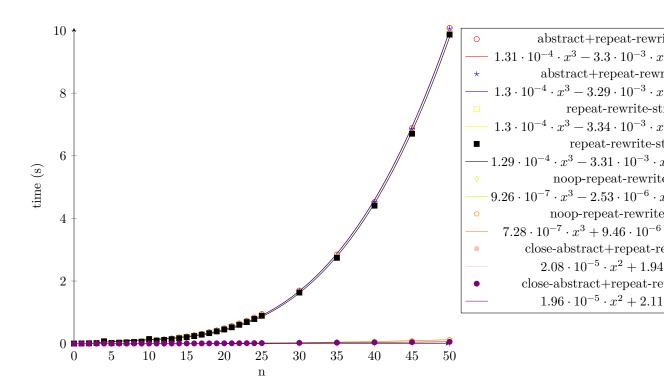
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



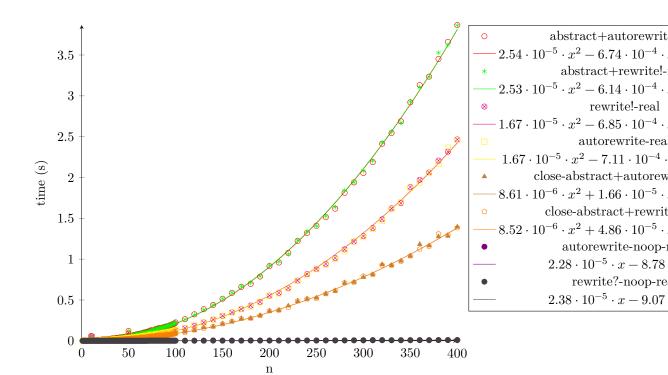
 $Figure \ 3: \ timing-repeat-setoid-rewrite-under-binders$



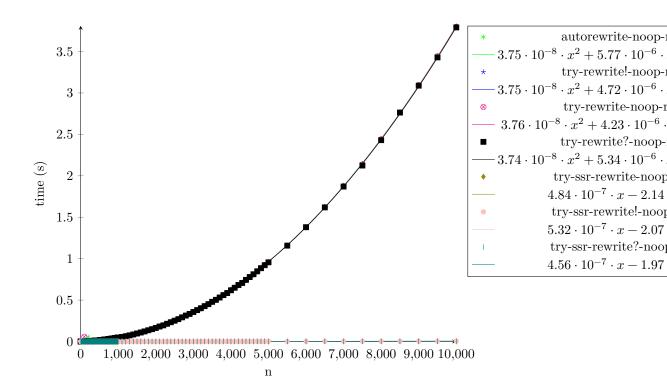
 $Figure\ 4:\ timing-repeat-setoid-rewrite-under-binders-noop$



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



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



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

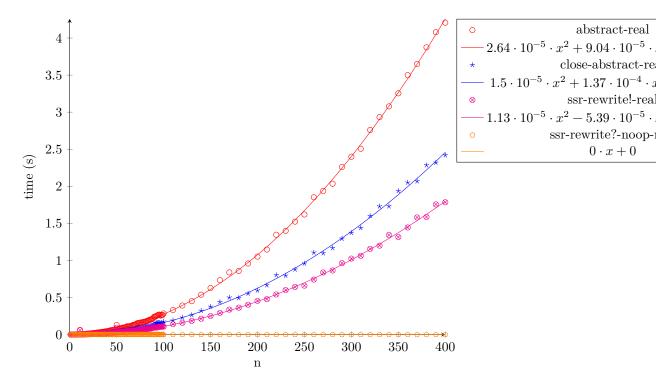
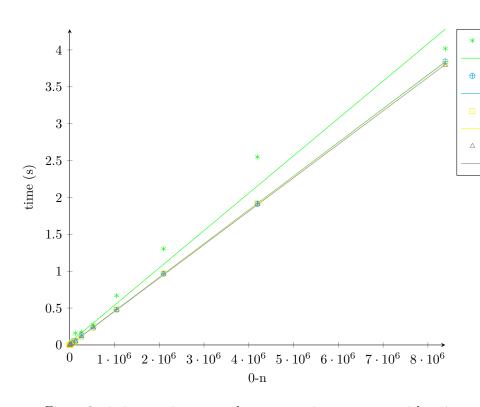


Figure 8: timing-rewrite-repeated-app-ssrrewrite



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

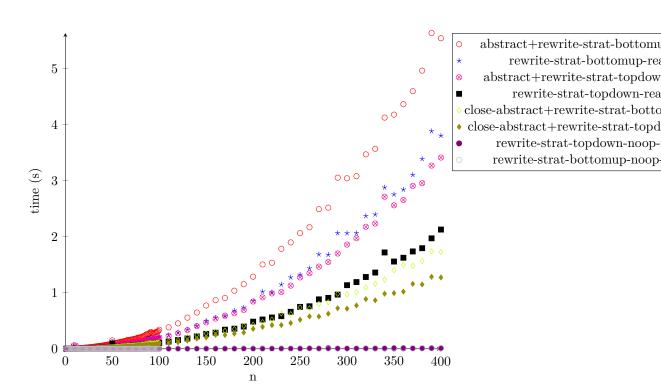
 $5.07 \cdot 10^{-7} \cdot x + 3.19 \cdot 10^{-2}$ try-ssr-rewrite!-noop-real

 $4.58 \cdot 10^{-7} \cdot x + 1.09 \cdot 10^{-3}$ try-ssr-rewrite?-noop-real

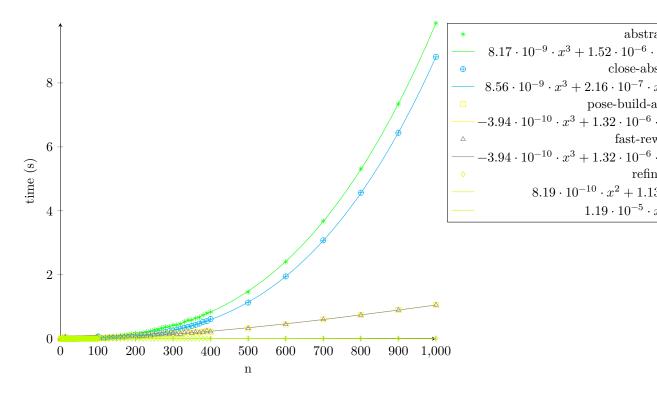
 $\begin{array}{l} 4.57\cdot 10^{-7}\cdot x - 4.8\cdot 10^{-5}\\ \text{try-ssr-rewrite-noop-real} \end{array}$

 $4.53\cdot 10^{-7}\cdot x - 2.96\cdot 10^{-4}$

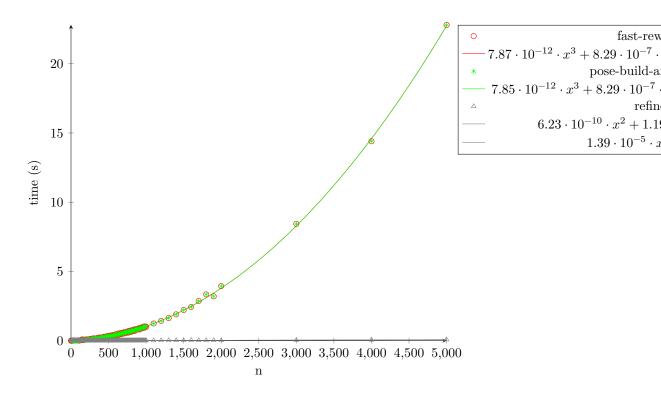
Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$



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



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



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

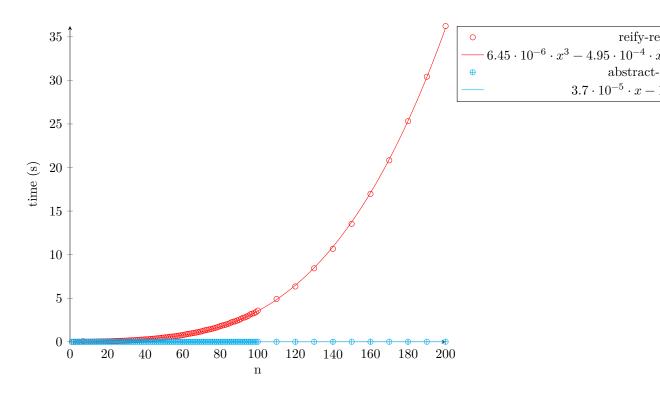


Figure 13: timing-typeclass-reification-let-in-HOAS

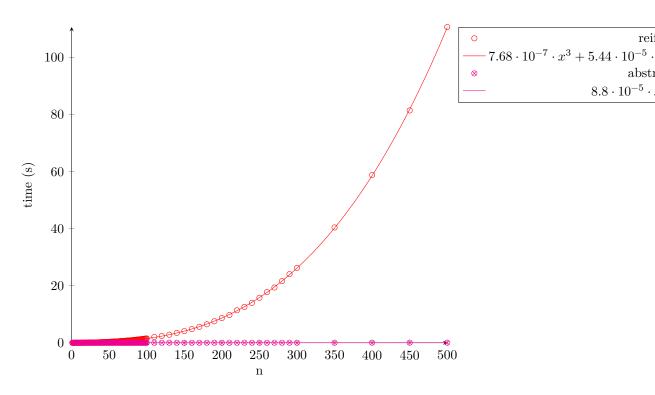


Figure 14: timing-typeclass-reification-let-in-PHOAS

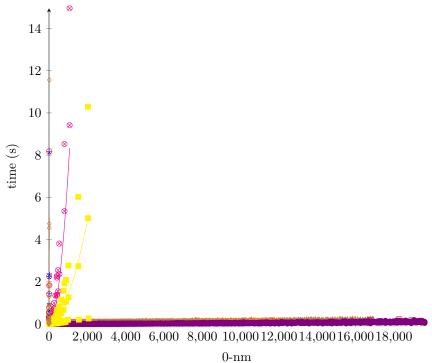


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

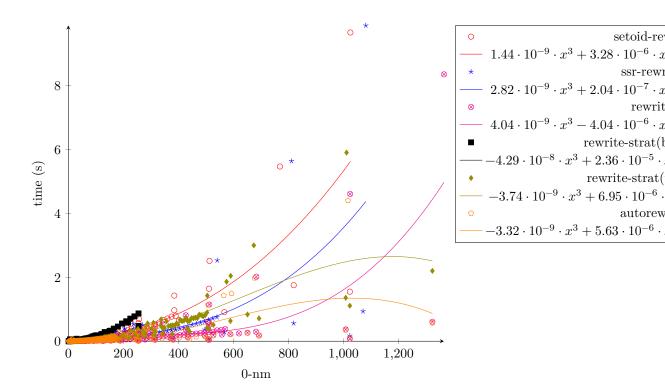
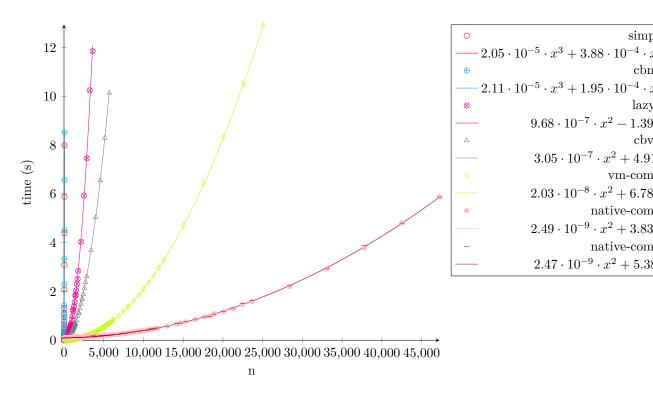


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



simp

lazy

vm-com

native-com

native-com

 $9.68 \cdot 10^{-7} \cdot x^2 - 1.39$

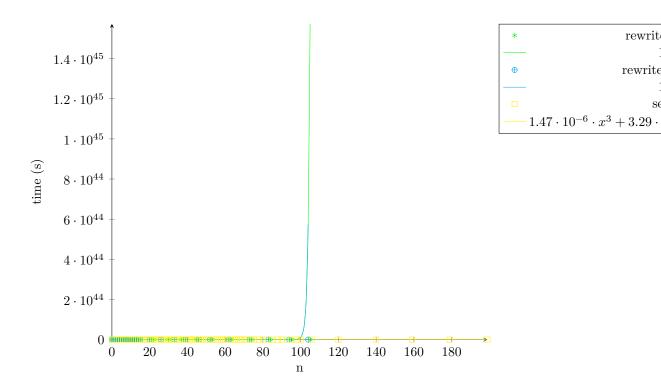
 $3.05 \cdot 10^{-7} \cdot x^2 + 4.91$

 $2.03 \cdot 10^{-8} \cdot x^2 + 6.78$

 $2.49 \cdot 10^{-9} \cdot x^2 + 3.83$

 $2.47 \cdot 10^{-9} \cdot x^2 + 5.38$

Figure 17: timing-sieve-of-eratosthenes



rewrite

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

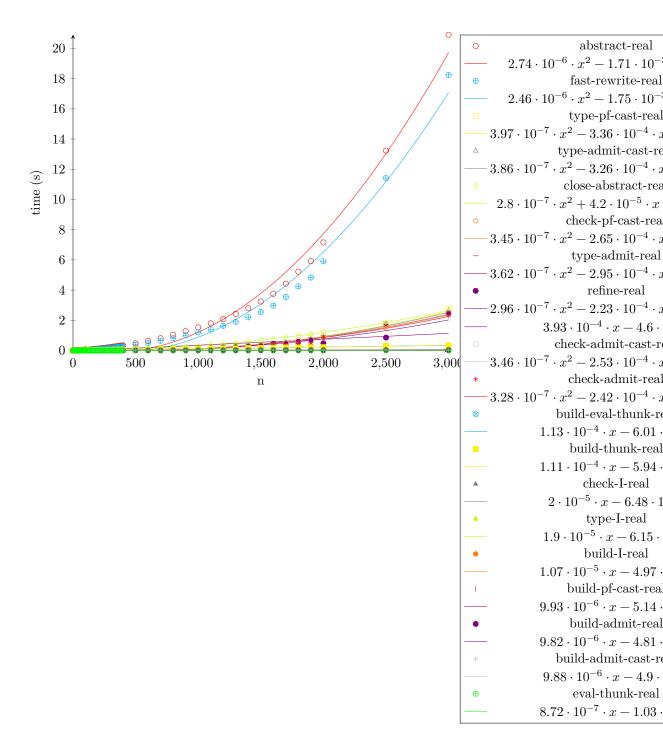


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2