

Figure 1: timing-pattern

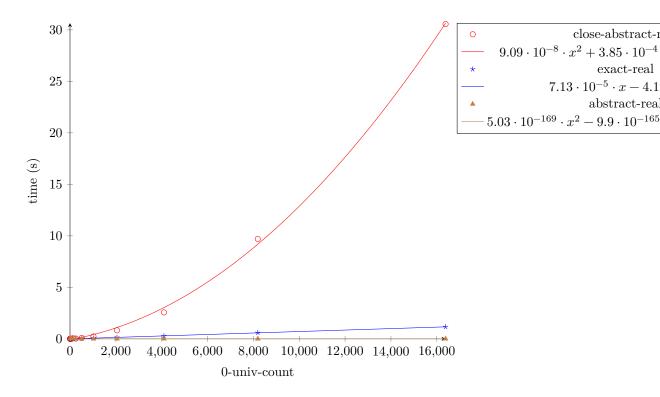
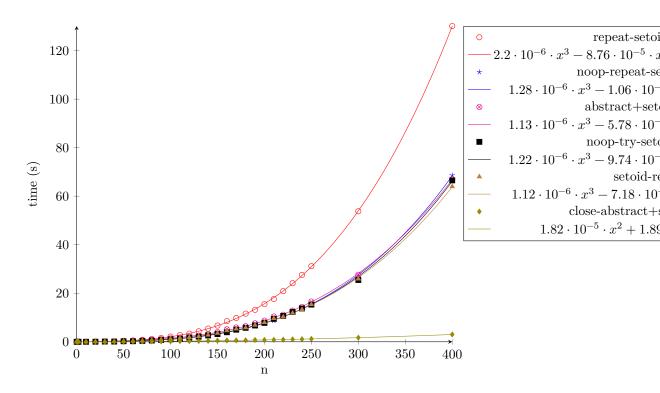


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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

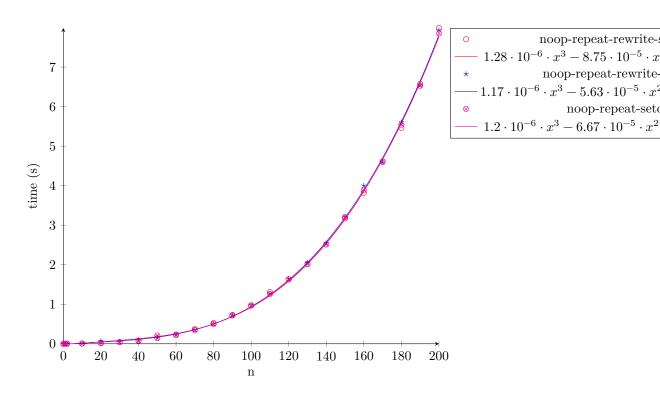
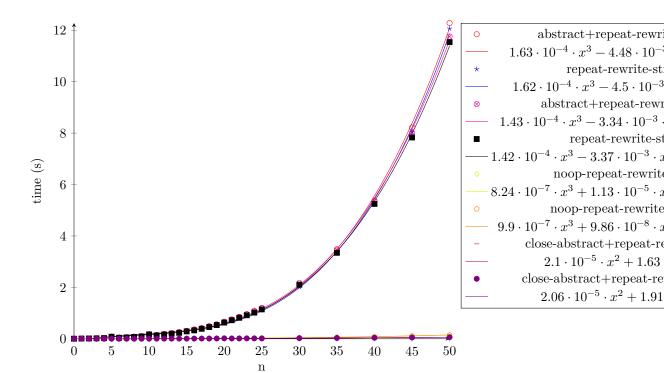
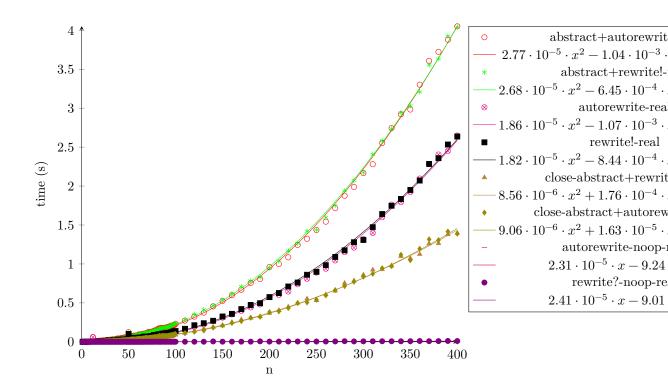


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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



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

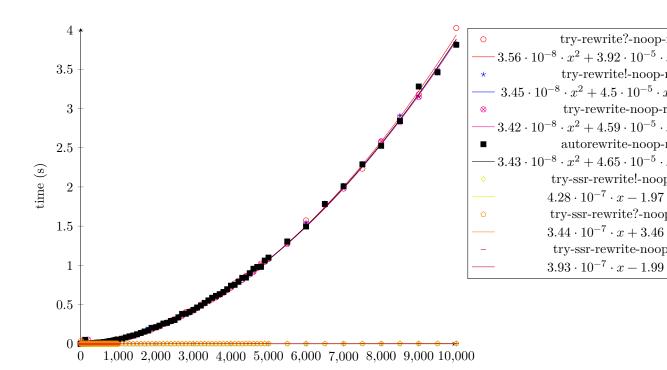


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

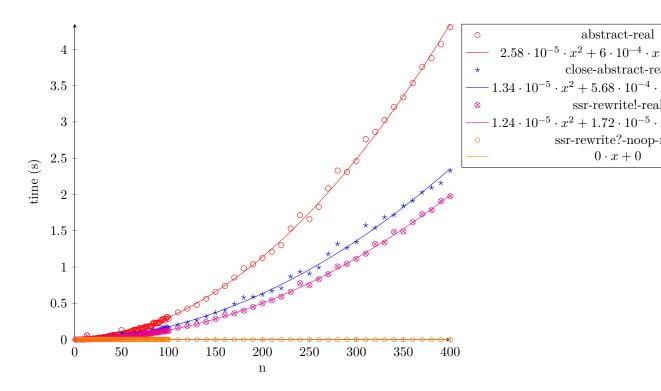
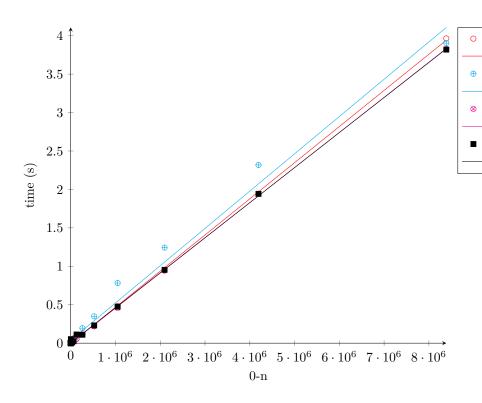


Figure 8: timing-rewrite-repeated-app-ssrrewrite



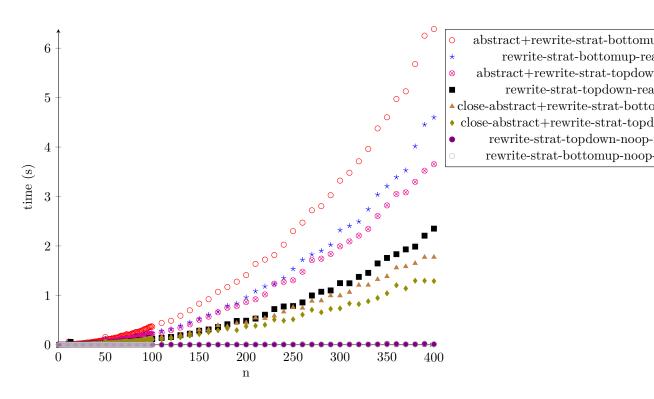
 $\begin{array}{c} \text{try-ssr-rewrite-noop-real} \\ 4.7 \cdot 10^{-7} \cdot x - 3.3 \cdot 10^{-3} \\ \text{try-ssr-rewrite!-cold-noop-rea} \end{array}$ 

 $4.85 \cdot 10^{-7} \cdot x + 3.73 \cdot 10^{-2}$  try-ssr-rewrite?-noop-real

 $\begin{array}{l} 4.57 \cdot 10^{-7} \cdot x - 2.09 \cdot 10^{-3} \\ \text{try-ssr-rewrite!-noop-real} \end{array}$ 

 $4.56\cdot 10^{-7}\cdot x + 4.19\cdot 10^{-3}$ 

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



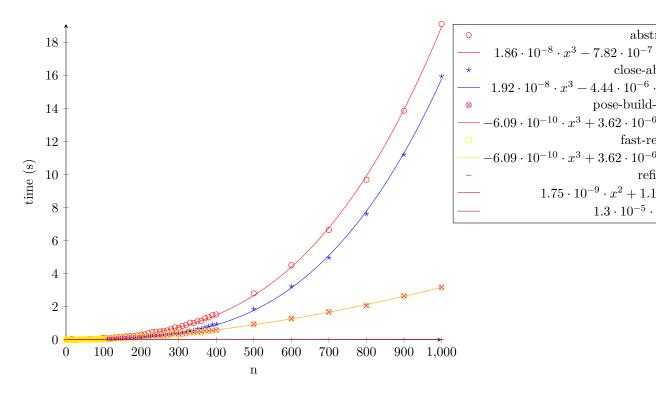
rewrite-strat-bottomup-real

rewrite-strat-topdown-rea

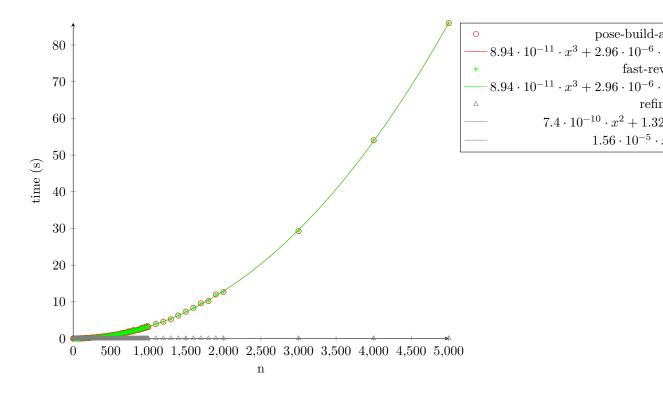
rewrite-strat-topdown-noop-

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

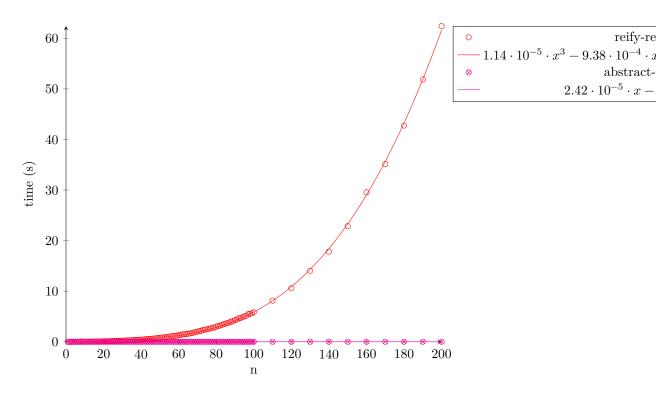


Figure 13: timing-typeclass-reification-let-in-HOAS

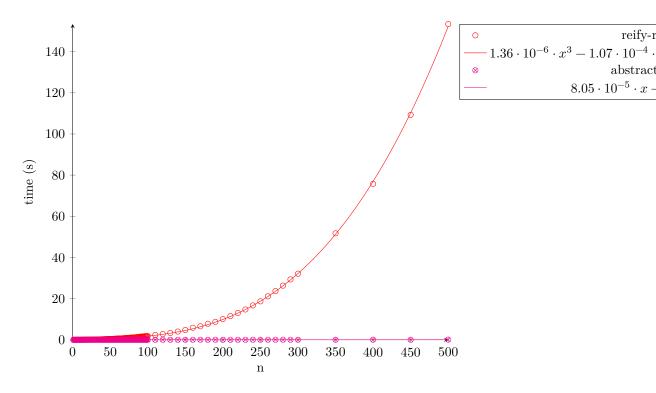


Figure 14: timing-typeclass-reification-let-in-PHOAS