

Figure 1: timing-pattern

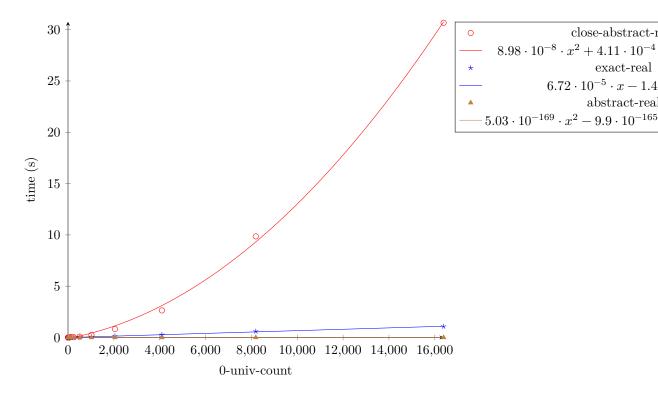
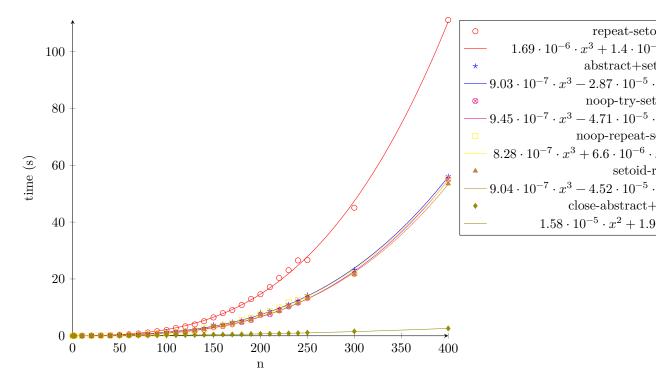


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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

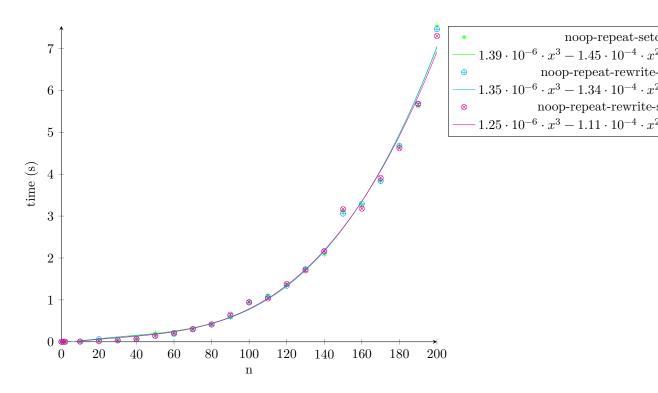
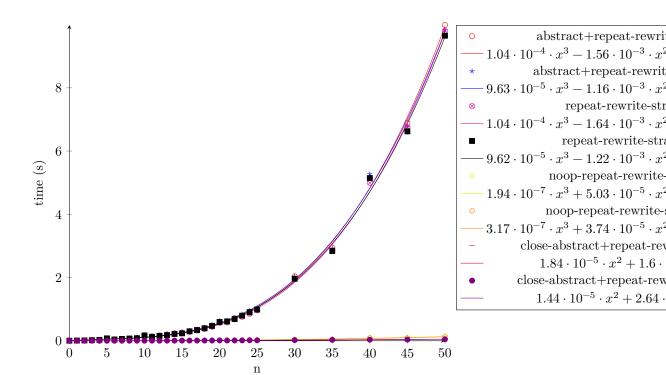
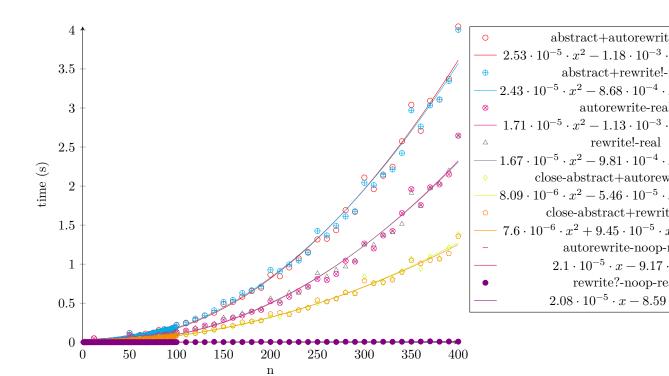


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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



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

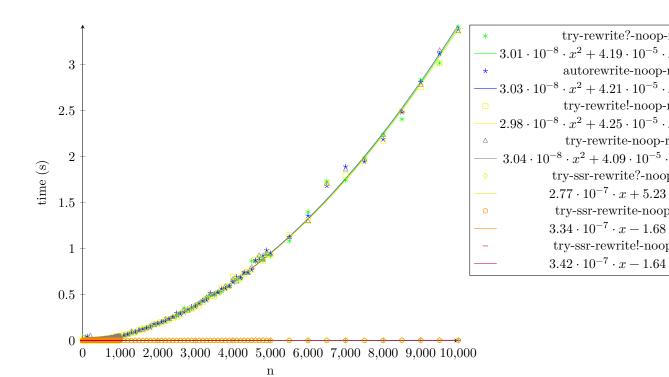
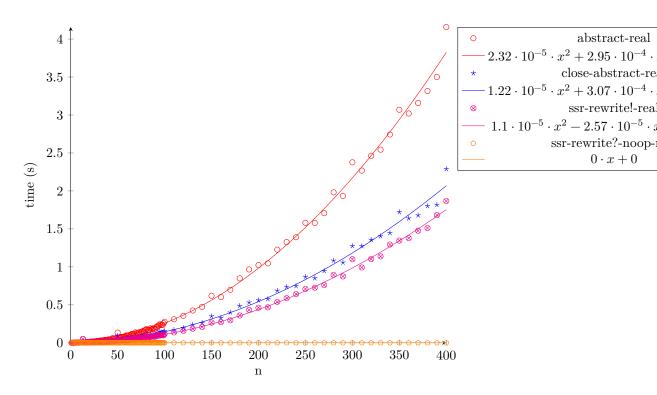
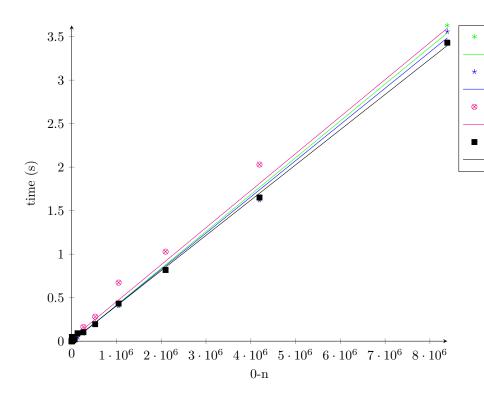


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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

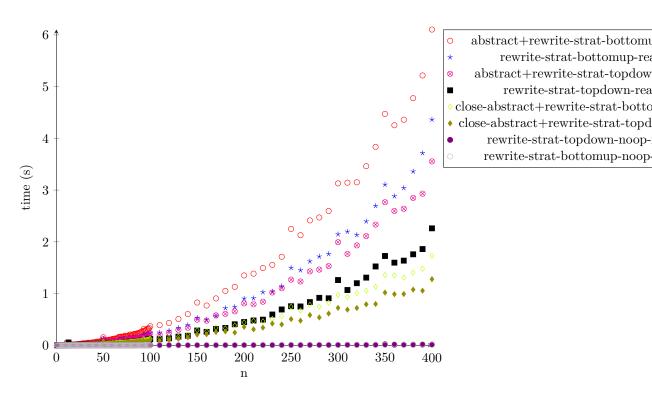


 $\begin{array}{l} \text{try-ssr-rewrite?-noop-real} \\ 4.24 \cdot 10^{-7} \cdot x - 9.61 \cdot 10^{-3} \\ \text{try-ssr-rewrite-noop-real} \end{array}$ 

 $4.16 \cdot 10^{-7} \cdot x - 7.39 \cdot 10^{-3}$  try-ssr-rewrite!-cold-noop-rea  $4.25 \cdot 10^{-7} \cdot x + 2.81 \cdot 10^{-2}$ 

try-ssr-rewrite!-noop-real  $4.05 \cdot 10^{-7} \cdot x + 6.52 \cdot 10^{-4}$ 

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

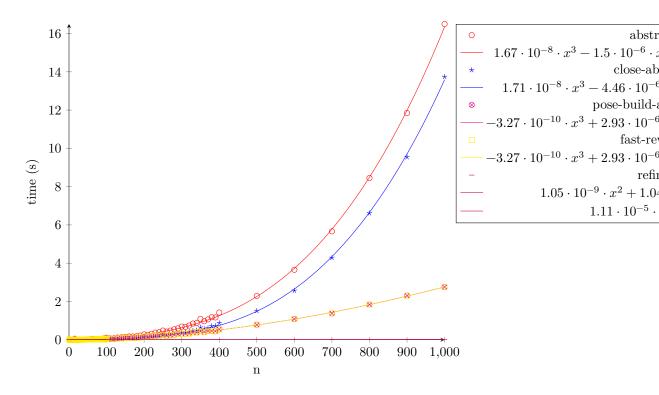


rewrite-strat-bottomup-rea abstract + rewrite - strat - topdow

rewrite-strat-topdown-rea

rewrite-strat-topdown-nooprewrite-strat-bottomup-noop-

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



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

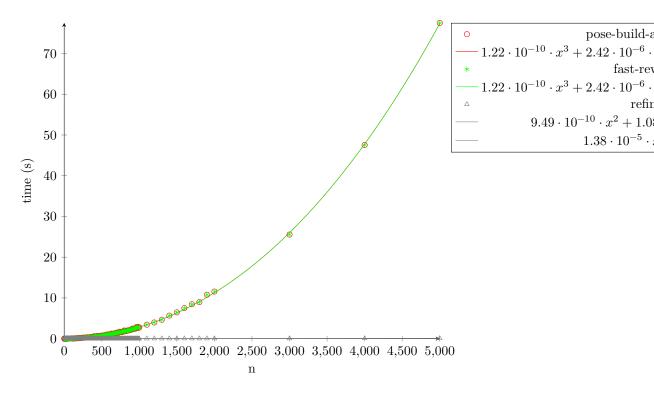


Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract

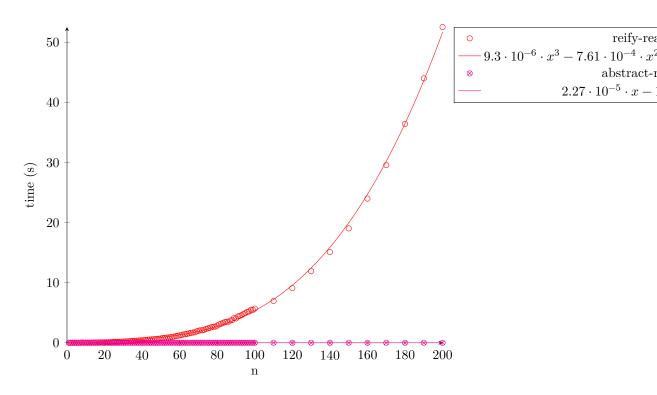
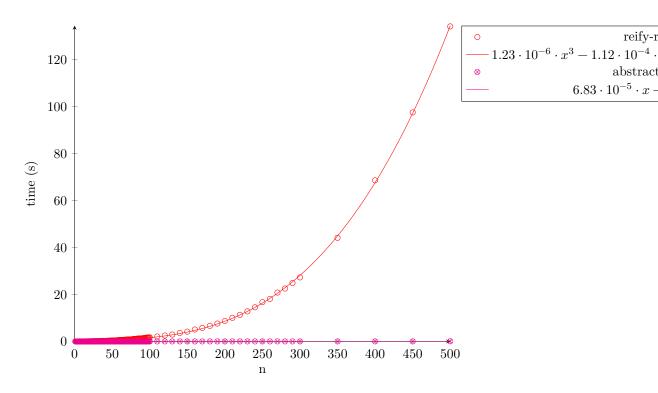


Figure 13: timing-typeclass-reification-let-in-HOAS



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