

Figure 1: timing-pattern

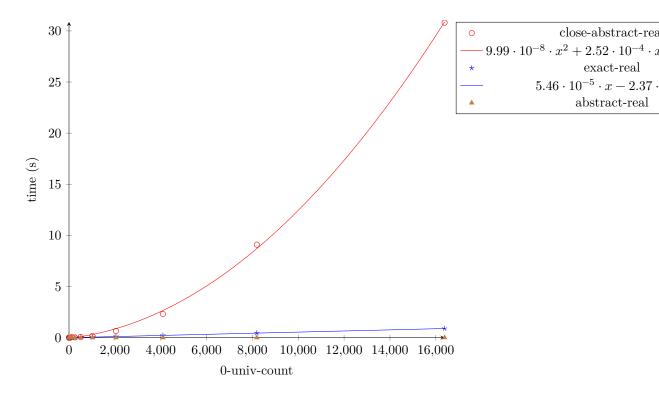


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

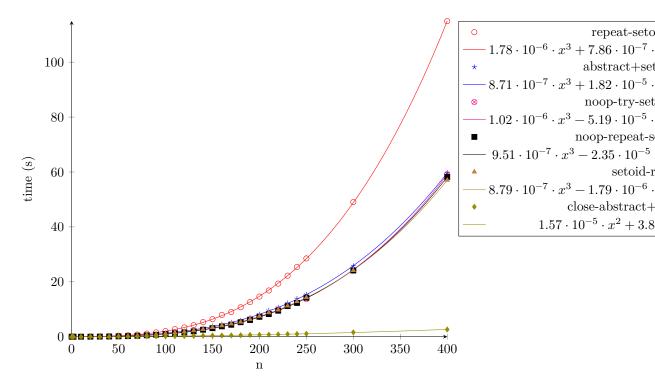
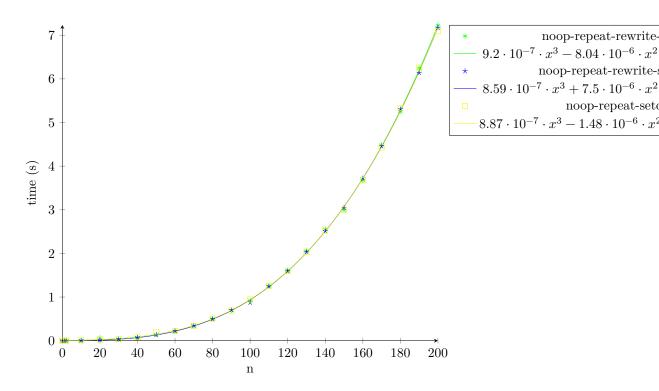
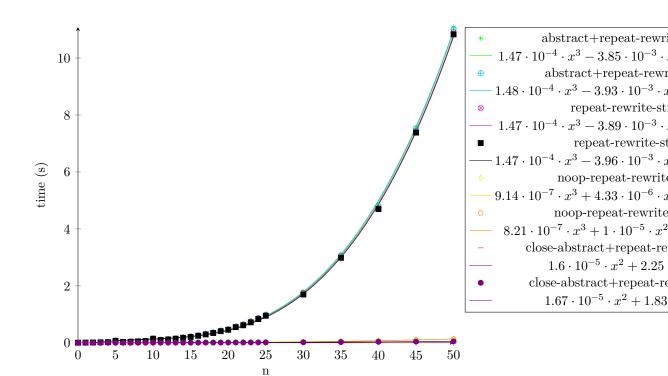


Figure 3: timing-repeat-setoid-rewrite-under-binders



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



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

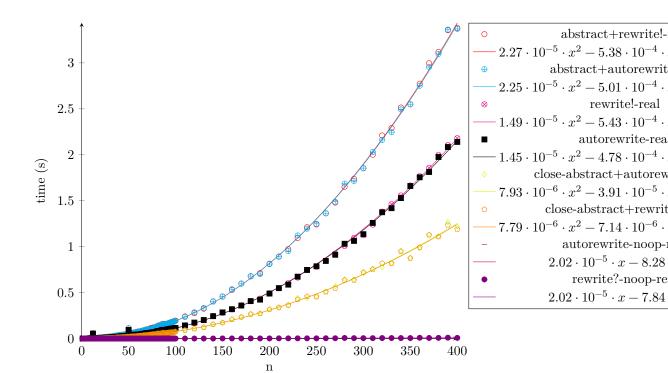


Figure 6: timing-rewrite-repeated-app-autorewrite

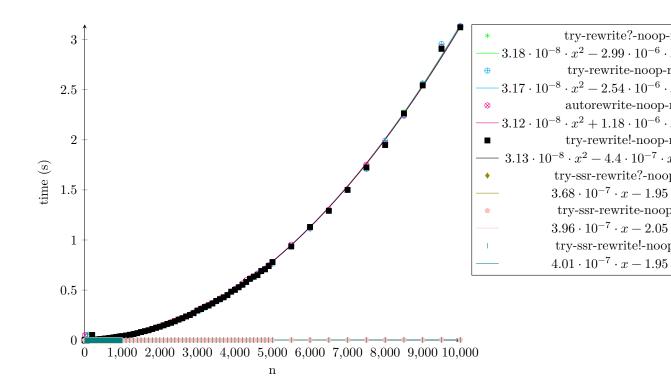
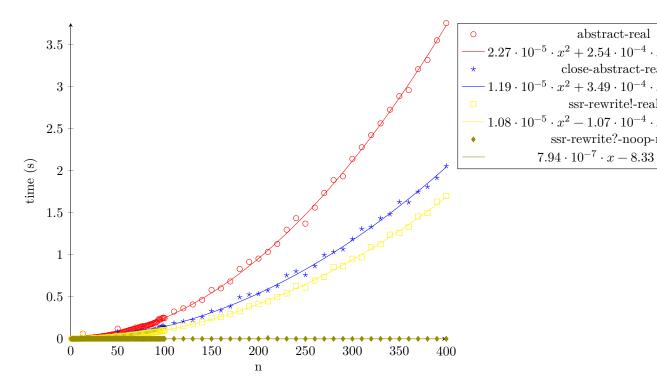
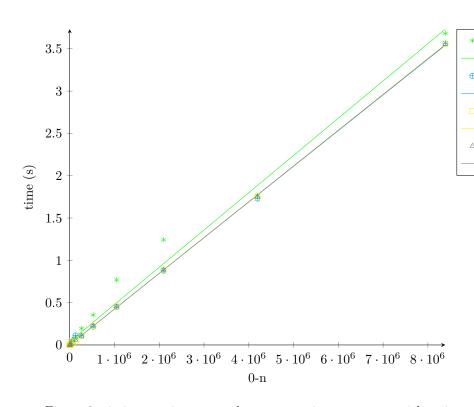


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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



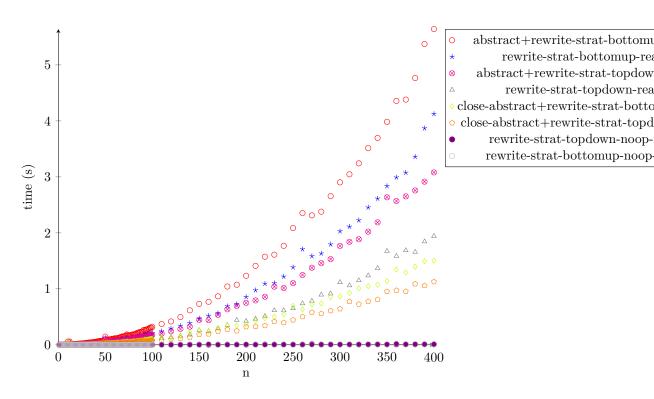
try-ssr-rewrite!-cold-noop-rea

 $4.4 \cdot 10^{-7} \cdot x + 3.83 \cdot 10^{-2}$ try-ssr-rewrite!-noop-real

 $\begin{aligned} &4.22\cdot 10^{-7}\cdot x + 1.18\cdot 10^{-3}\\ &\text{try-ssr-rewrite?-noop-real}\\ &4.23\cdot 10^{-7}\cdot x + 1.64\cdot 10^{-4} \end{aligned}$ 

try-ssr-rewrite-noop-real  $4.23 \cdot 10^{-7} \cdot x + 1.56 \cdot 10^{-3}$ 

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



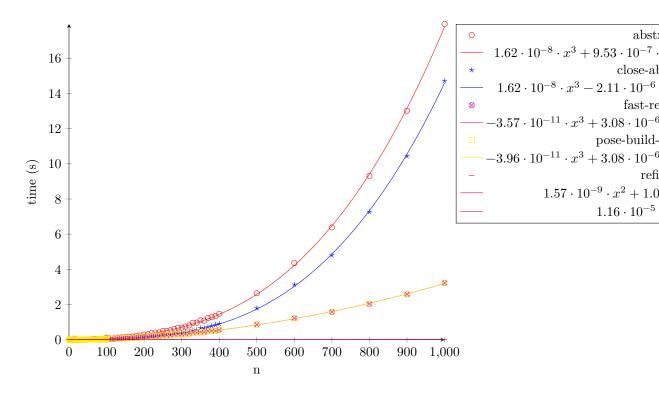
rewrite-strat-bottomup-rea

rewrite-strat-topdown-rea

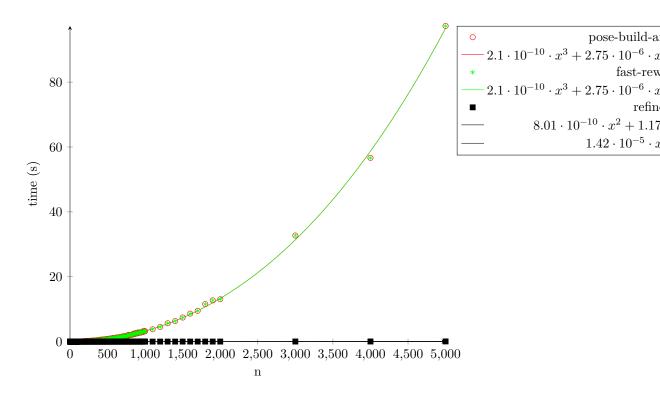
rewrite-strat-topdown-nooprewrite-strat-bottomup-noop-

abstract + rewrite - strat - topdow

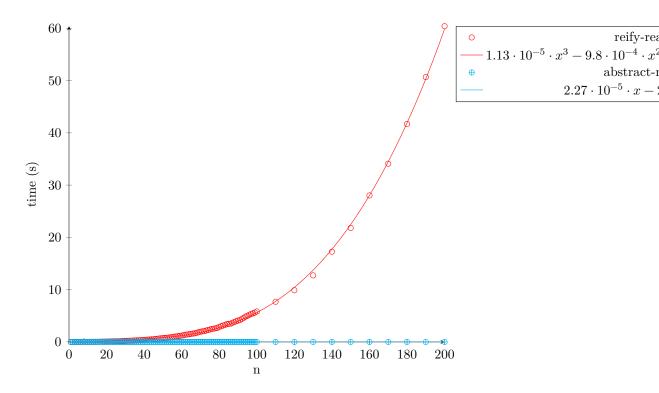
 $Figure~10:~timing\mbox{-rewrite-repeated-app-rewrite-strat}$ 



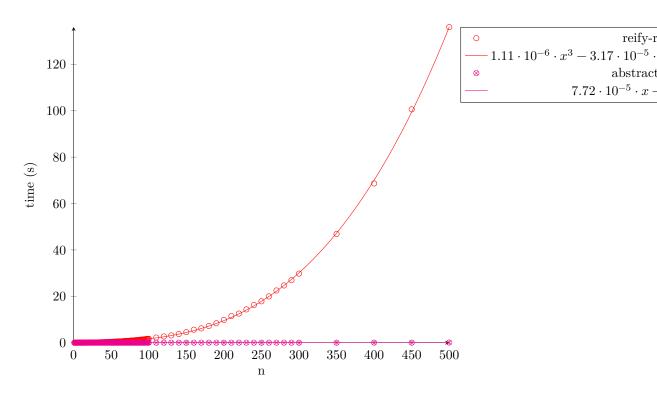
 $Figure~11:~timing\mbox{-rewrite-repeated-app-fast-rewrite}$ 



 $Figure~12:~timing\mbox{-rewrite-repeated-app-fast-rewrite-no-abstract}$ 



 ${\bf Figure~13:~timing-type class-reification-let-in-HOAS}$ 



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