

Figure 1: timing-pattern

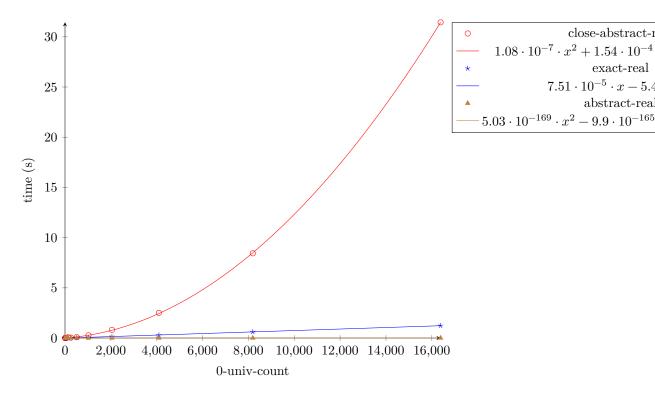
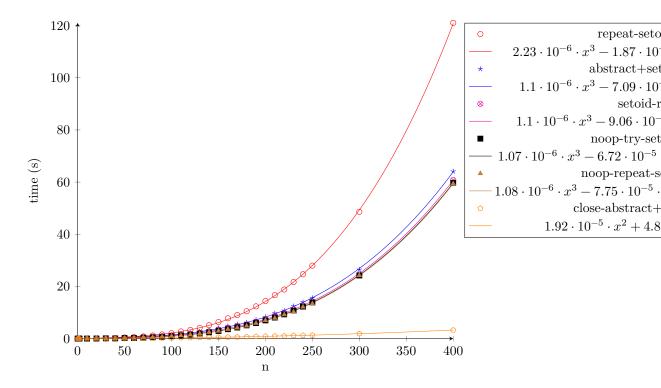


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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

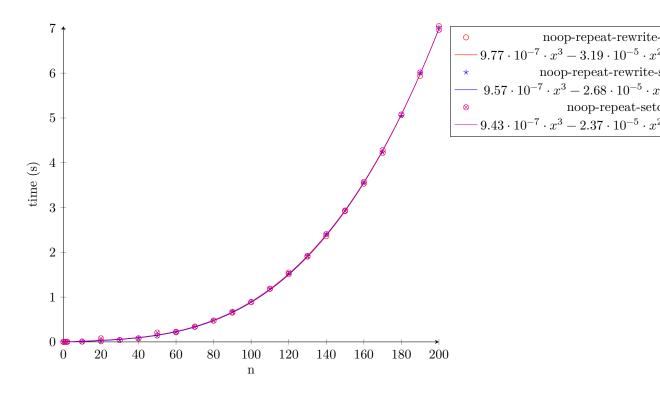
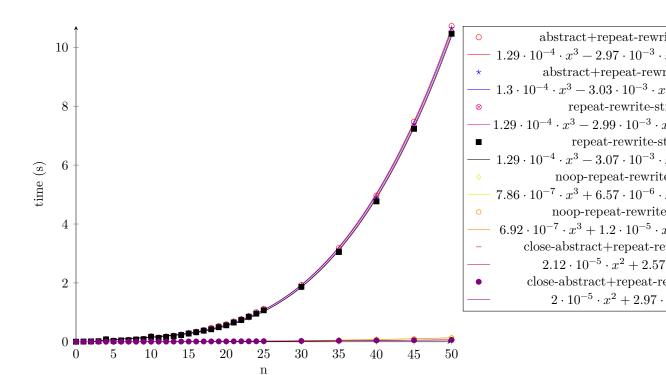


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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

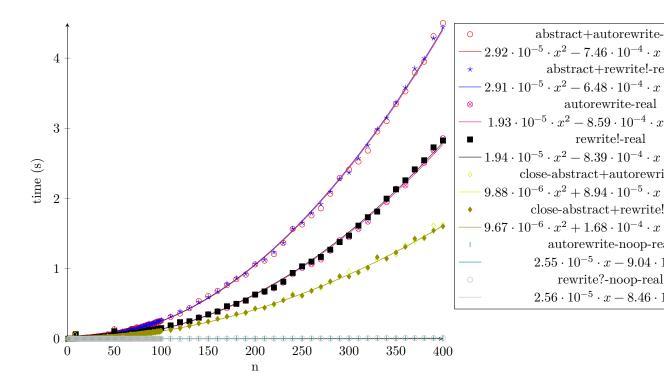
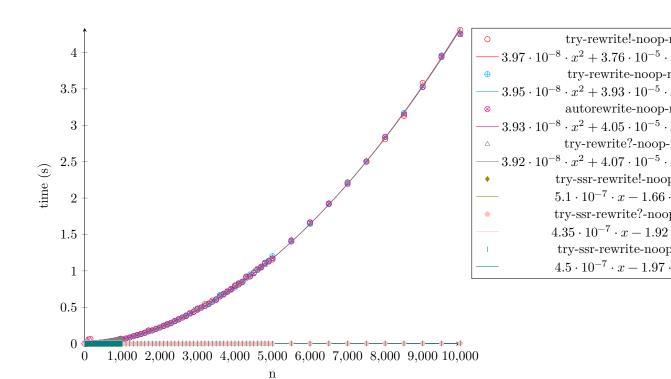


Figure 6: timing-rewrite-repeated-app-autorewrite



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

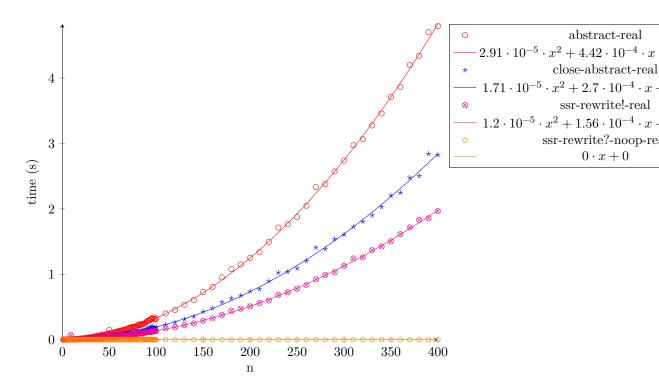
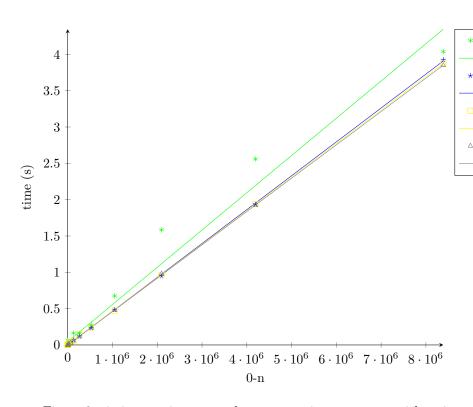


Figure 8: timing-rewrite-repeated-app-ssrrewrite



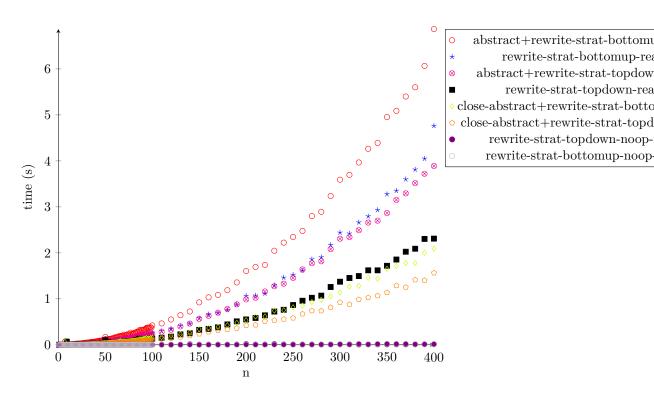
try-ssr-rewrite!-cold-noop-rea $5.13\cdot 10^{-7}\cdot x + 4.39\cdot 10^{-2}$ 

try-ssr-rewrite-noop-real

 $\begin{aligned} &4.66\cdot 10^{-7}\cdot x - 2.43\cdot 10^{-3}\\ &\text{try-ssr-rewrite!-noop-real}\\ &4.62\cdot 10^{-7}\cdot x + 1.46\cdot 10^{-3} \end{aligned}$ 

try-ssr-rewrite?-noop-real  $4.59\cdot 10^{-7}\cdot x - 5.75\cdot 10^{-4}$ 

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

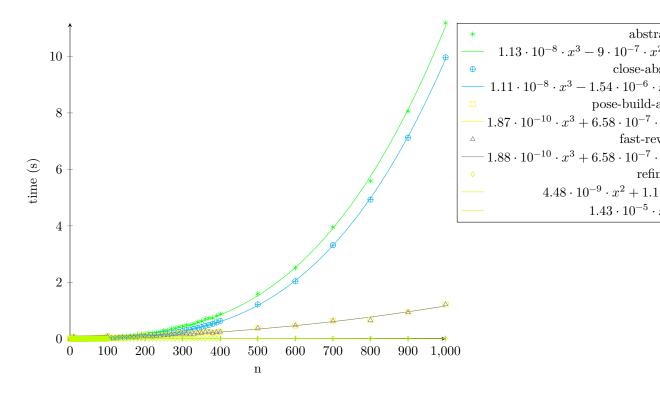


rewrite-strat-bottomup-rea

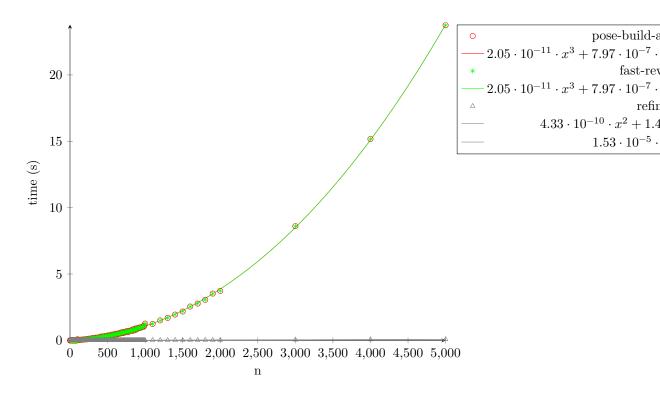
abstract + rewrite - strat - topdowrewrite-strat-topdown-rea

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

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



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



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

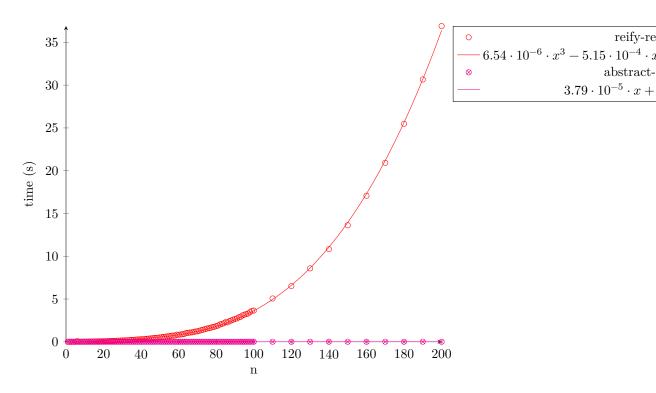


Figure 13: timing-typeclass-reification-let-in-HOAS

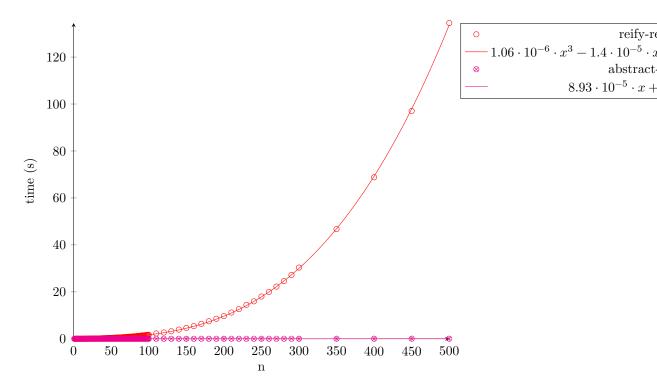


Figure 14: timing-typeclass-reification-let-in-PHOAS