

Figure 1: timing-pattern

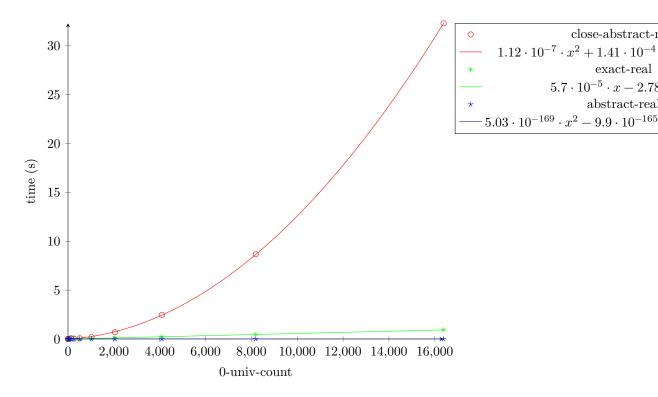
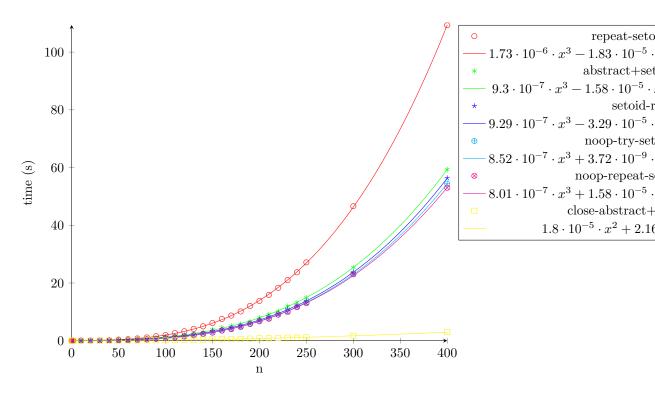
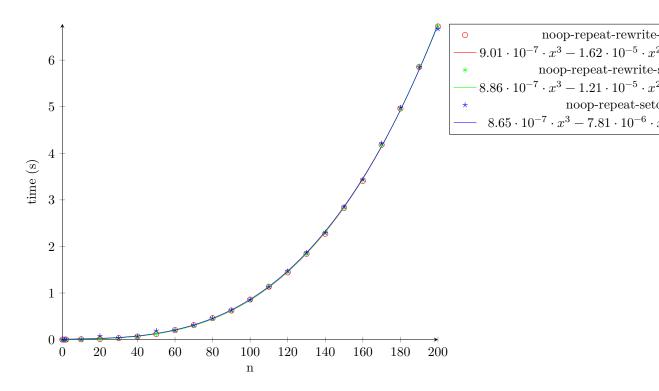


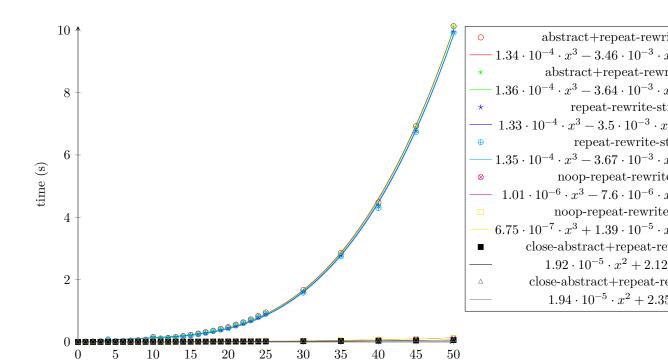
Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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



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



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

 $\mathbf{n}$ 

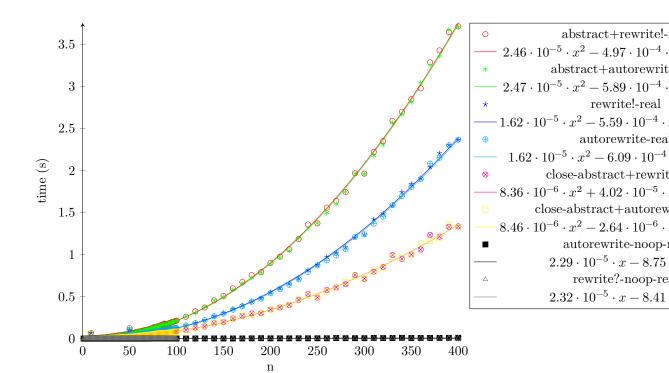
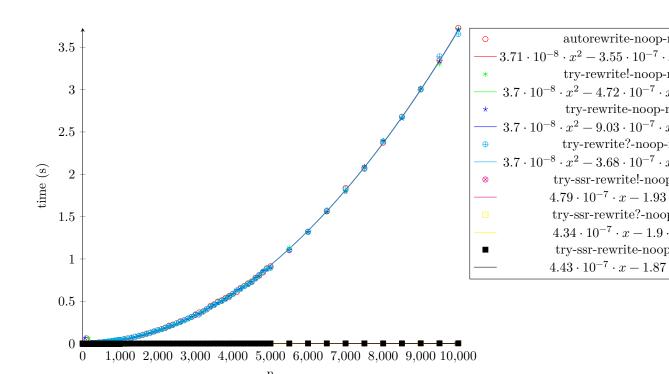


Figure 6: timing-rewrite-repeated-app-autorewrite



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

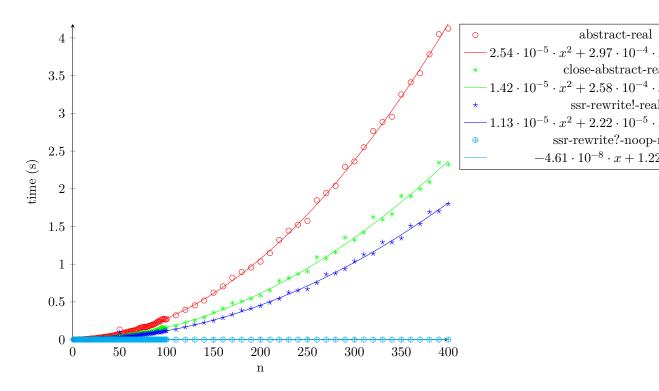
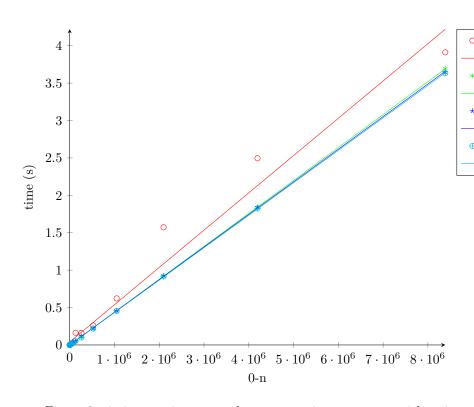


Figure 8: timing-rewrite-repeated-app-ssrrewrite



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

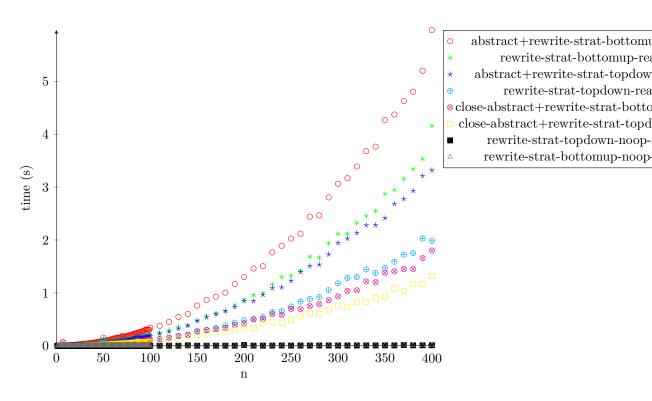
 $4.98 \cdot 10^{-7} \cdot x + 3.97 \cdot 10^{-2}$  try-ssr-rewrite?-noop-real

 $\begin{array}{l} 4.4\cdot 10^{-7}\cdot x - 2.71\cdot 10^{-3}\\ \text{try-ssr-rewrite!-noop-real} \end{array}$ 

 $\begin{array}{l} 4.36\cdot 10^{-7}\cdot x + 1.62\cdot 10^{-3} \\ \text{try-ssr-rewrite-noop-real} \end{array}$ 

 $4.34 \cdot 10^{-7} \cdot x - 1.23 \cdot 10^{-3}$ 

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-

 $Figure\ 10:\ timing-rewrite-repeated-app-rewrite-strat$ 

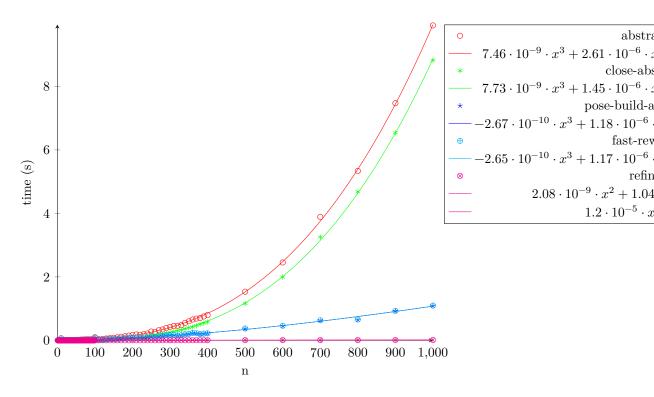
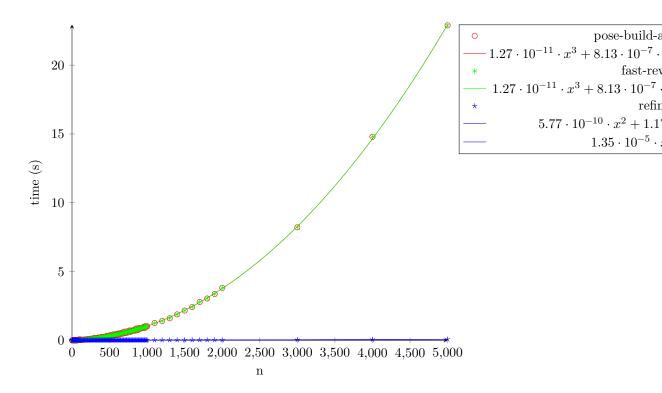


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

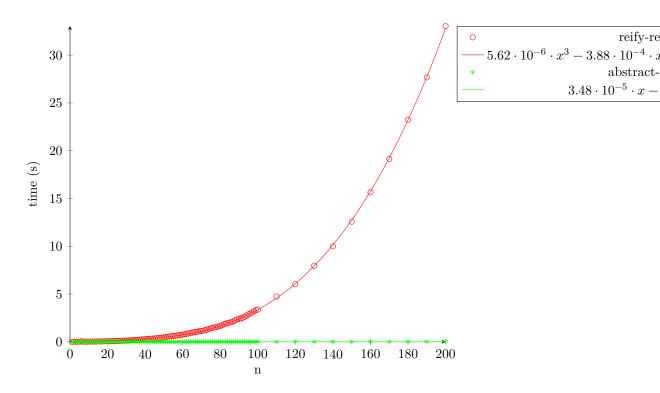
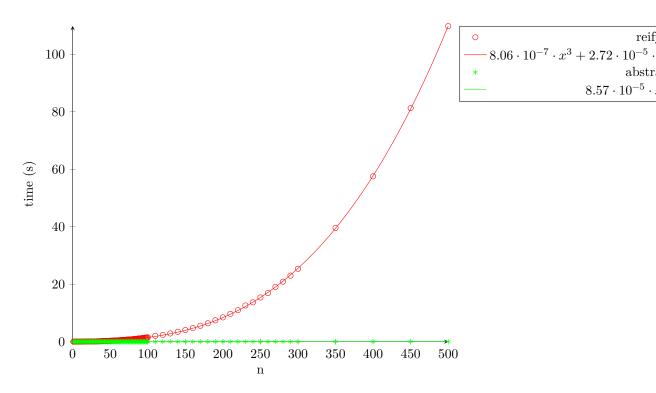


Figure 13: timing-typeclass-reification-let-in-HOAS



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

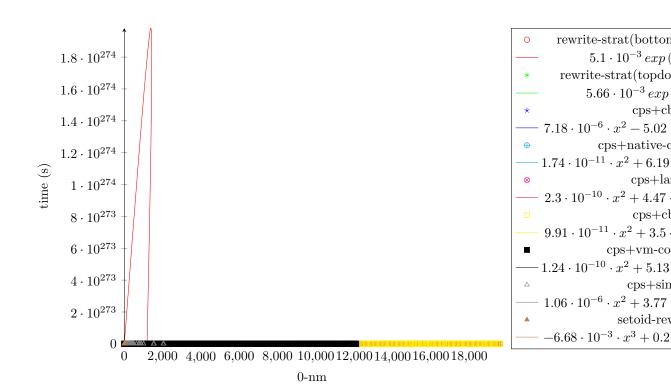


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1