

Figure 1: timing-pattern

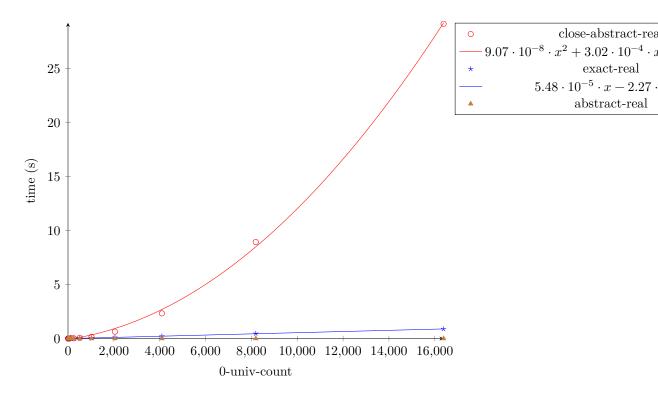
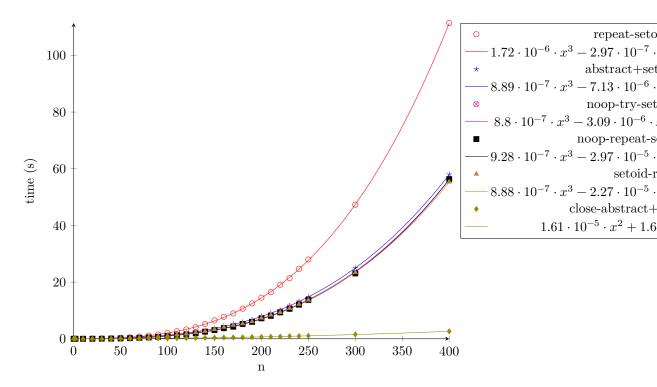
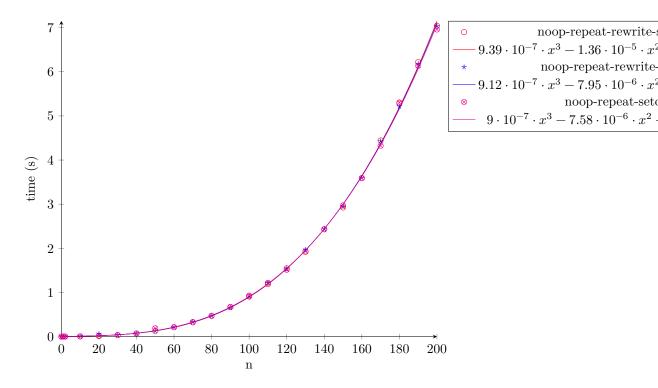


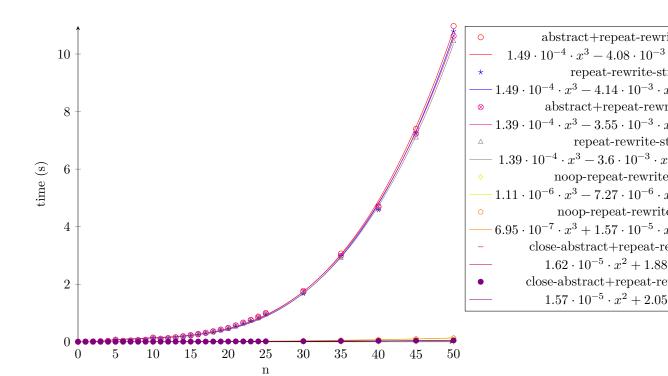
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



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



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



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

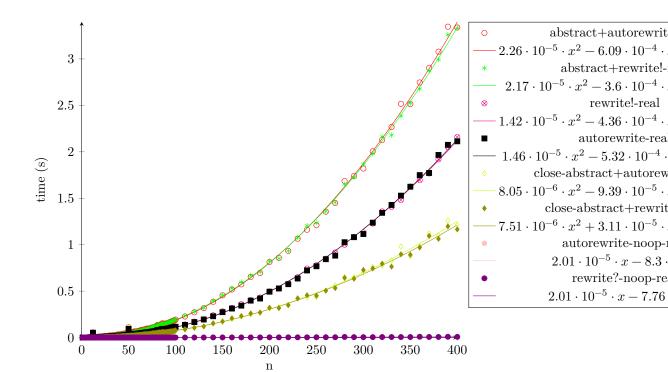
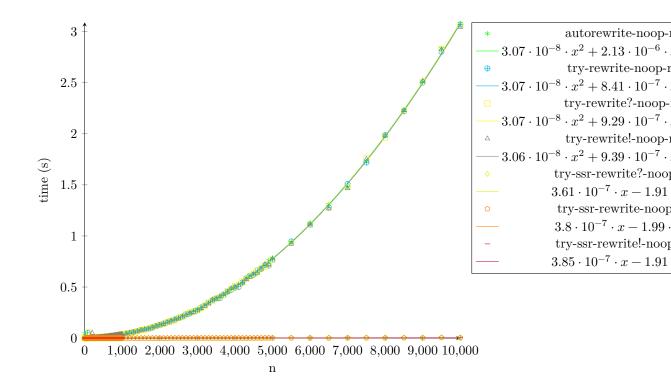
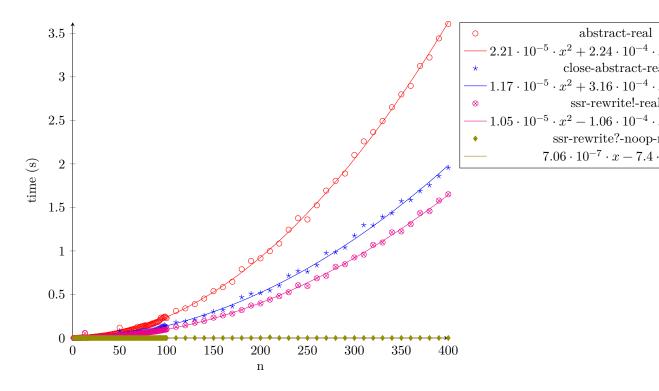


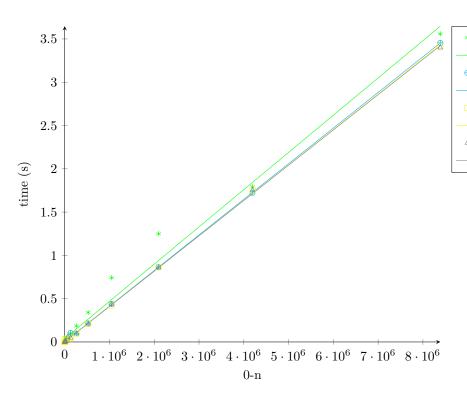
Figure 6: timing-rewrite-repeated-app-autorewrite



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



 ${\bf Figure~8:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}ssrrewrite}$



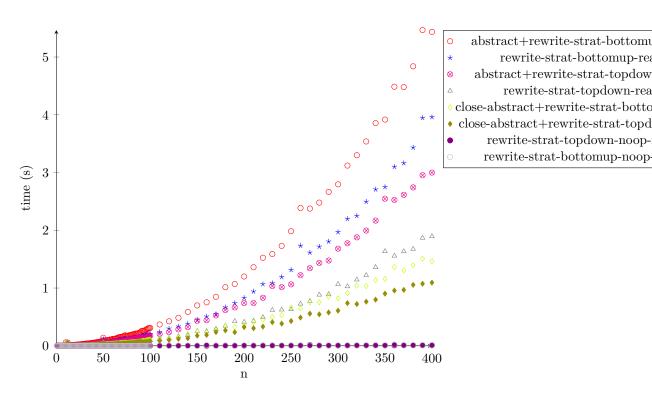
try-ssr-rewrite!-cold-noop-rea

 $4.3 \cdot 10^{-7} \cdot x + 3.91 \cdot 10^{-2}$ try-ssr-rewrite!-noop-real

 $\begin{aligned} &4.12 \cdot 10^{-7} \cdot x + 1.82 \cdot 10^{-3} \\ &\text{try-ssr-rewrite?-noop-real} \\ &4.09 \cdot 10^{-7} \cdot x - 6.45 \cdot 10^{-5} \end{aligned}$

try-ssr-rewrite-noop-real $4.08\cdot 10^{-7}\cdot x + 2.48\cdot 10^{-3}$

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



 $abstract + rewrite - strat - bottom \\ \\$

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

rewrite-strat-topdown-rea

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

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

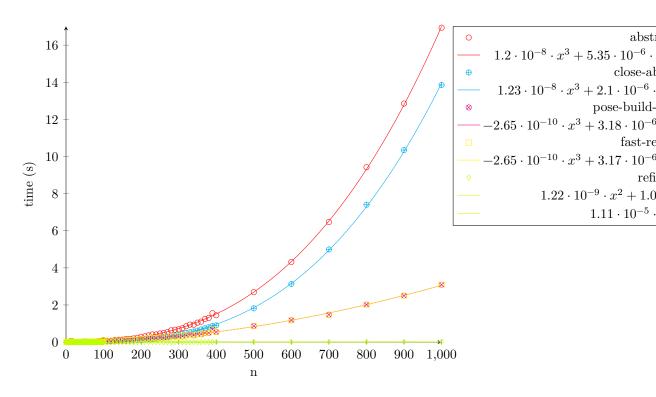
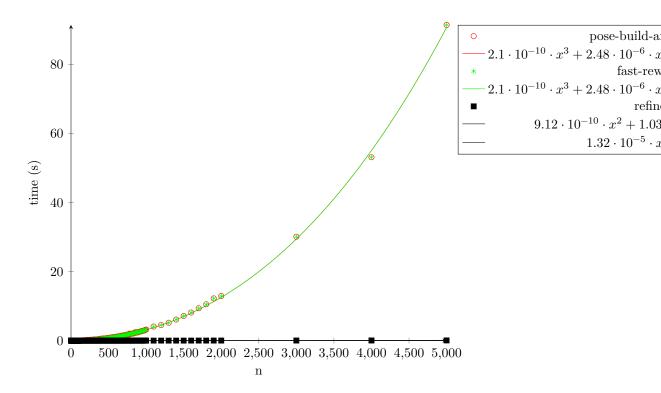


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

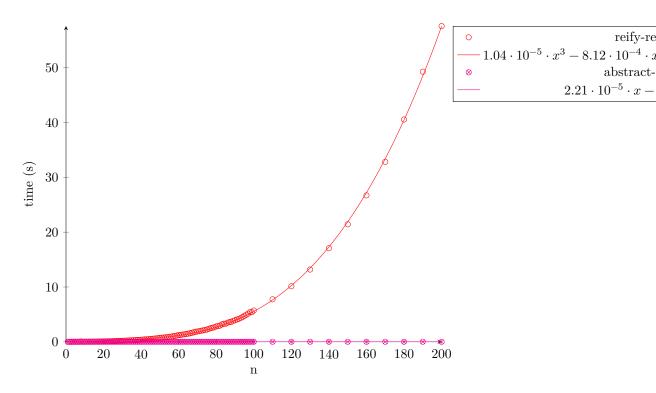
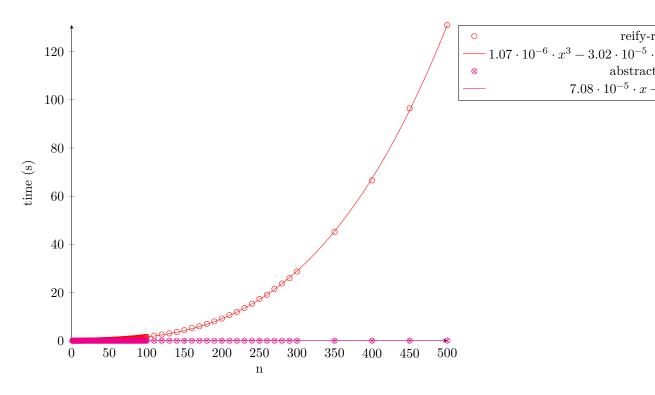


Figure 13: timing-typeclass-reification-let-in-HOAS



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