

Figure 1: timing-pattern

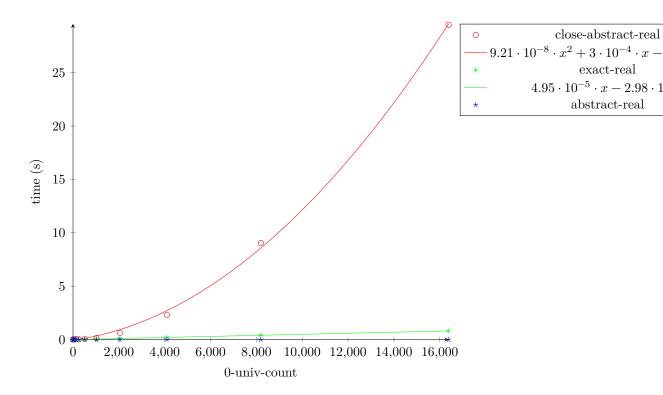


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

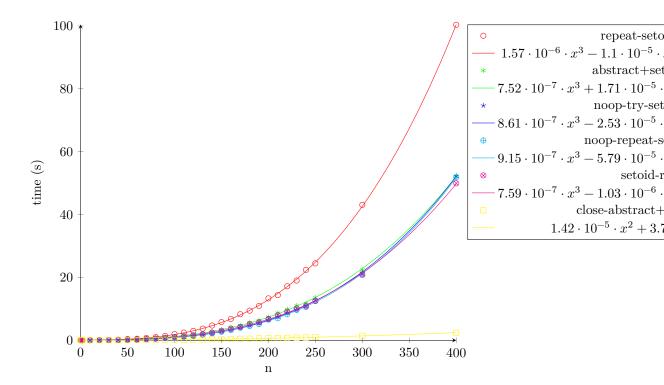
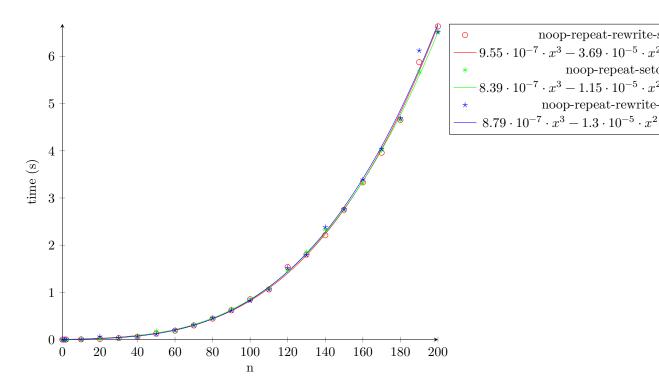
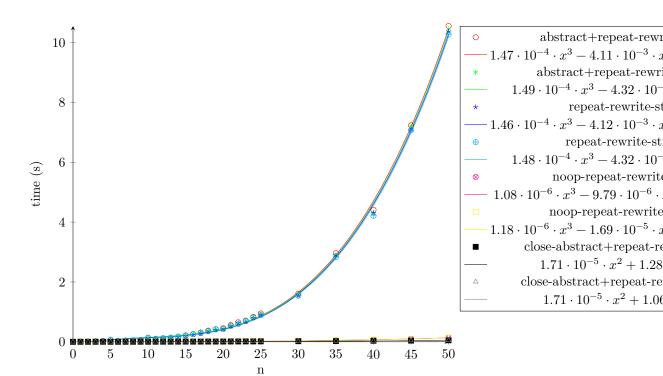


Figure 3: timing-repeat-setoid-rewrite-under-binders



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



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

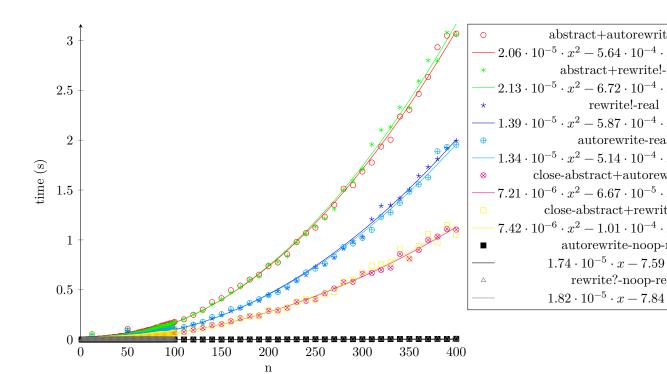
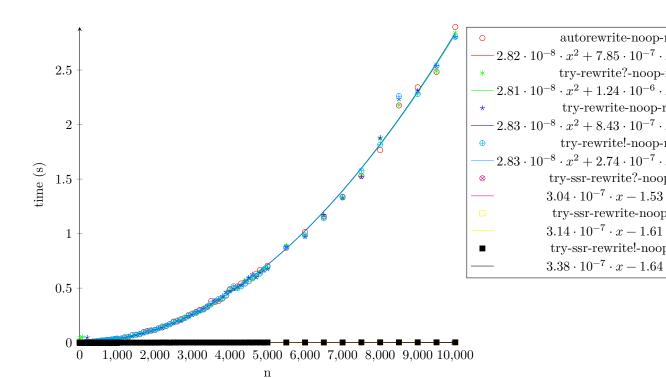
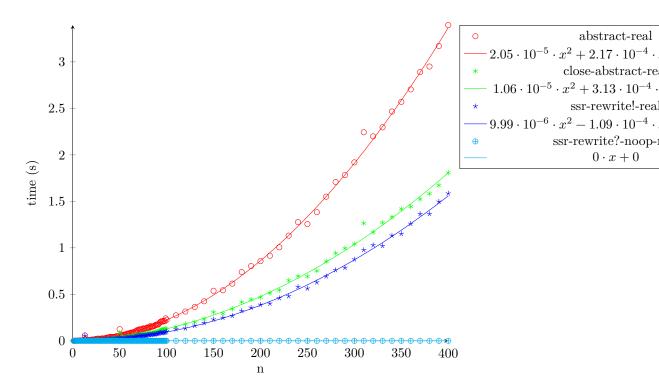


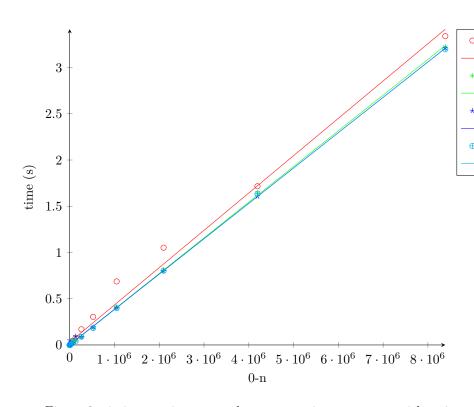
Figure 6: timing-rewrite-repeated-app-autorewrite



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



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



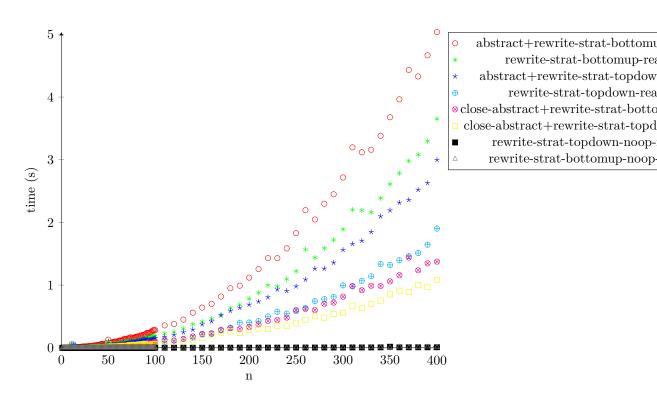
try-ssr-rewrite!-cold-noop-rea  $4.04 \cdot 10^{-7} \cdot x + 2.92 \cdot 10^{-2}$ 

 $\begin{array}{l} \text{try-ssr-rewrite-noop-real} \\ 3.86 \cdot 10^{-7} \cdot x + 2.98 \cdot 10^{-4} \\ \text{try-ssr-rewrite!-noop-real} \end{array}$ 

 $\begin{array}{l} 3.82\cdot 10^{-7}\cdot x + 3.36\cdot 10^{-3}\\ \text{try-ssr-rewrite?-noop-real} \end{array}$ 

 $3.83\cdot 10^{-7}\cdot x - 1.07\cdot 10^{-3}$ 

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-

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

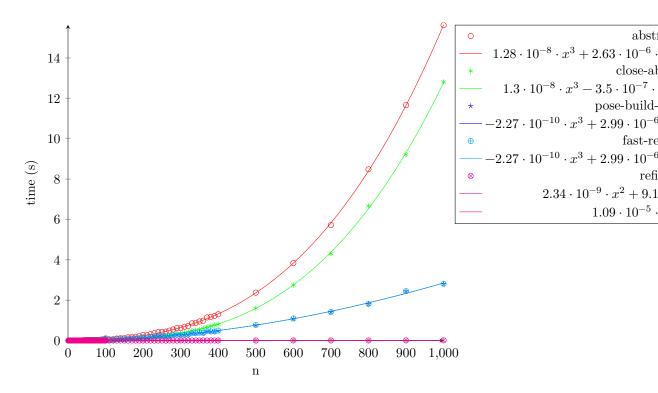
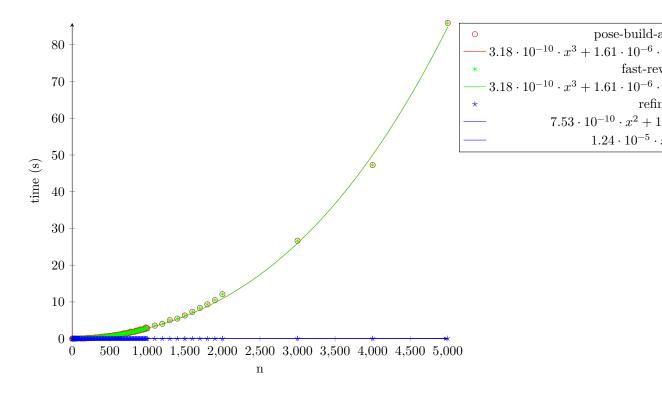


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

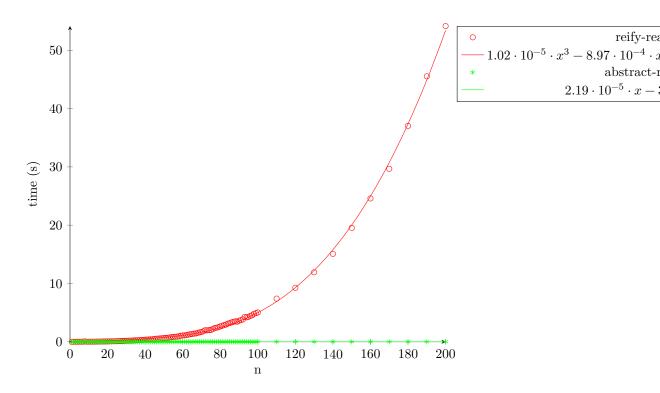
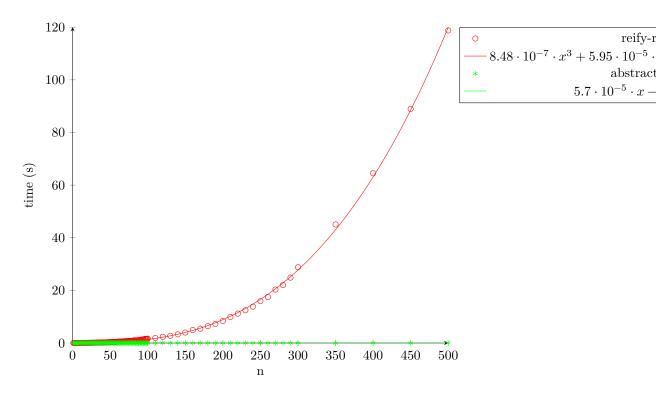


Figure 13: timing-typeclass-reification-let-in-HOAS



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