

Figure 1: timing-pattern

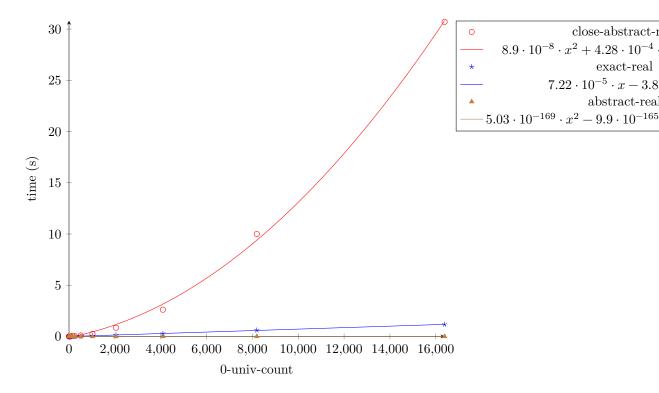


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

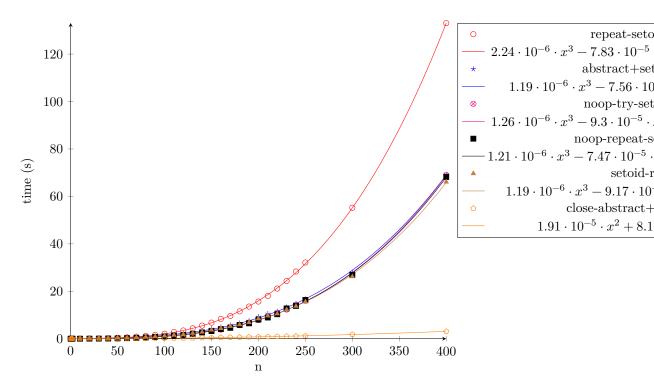
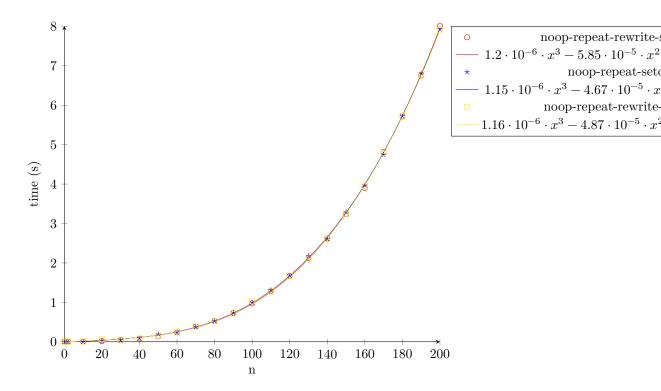
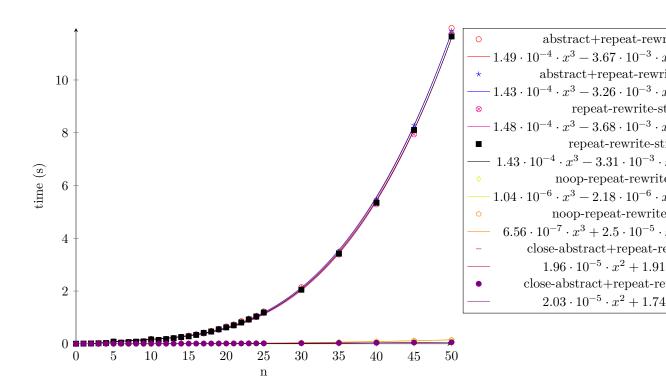


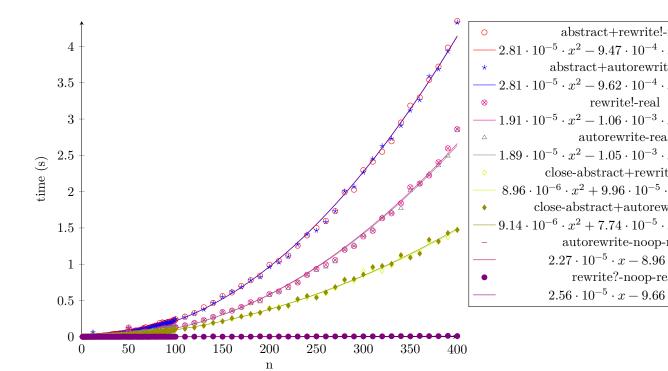
Figure 3: timing-repeat-setoid-rewrite-under-binders



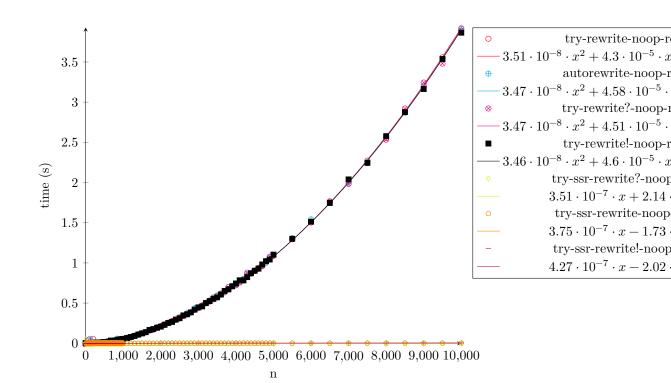
 $Figure \ 4: \ timing-repeat-setoid-rewrite-under-binders-noop \\$ 



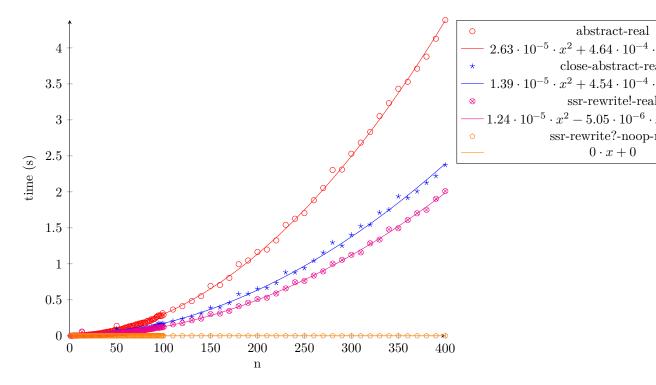
 $Figure\ 5:\ timing-rewrite-strat-under-binders$ 



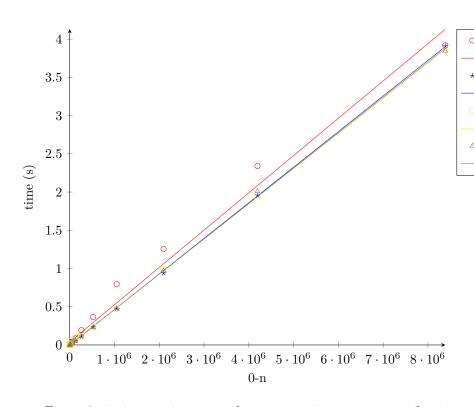
 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$ 



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



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



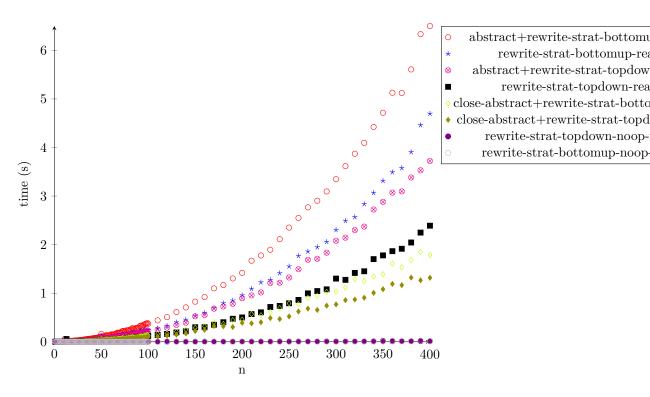
try-ssr-rewrite!-cold-noop-rea  $4.88 \cdot 10^{-7} \cdot x + 3.84 \cdot 10^{-2}$ try-ssr-rewrite-noop-real

 $\begin{array}{l} 4.65 \cdot 10^{-7} \cdot x - 1.85 \cdot 10^{-3} \\ \text{try-ssr-rewrite!-noop-real} \end{array}$ 

 $4.6\cdot 10^{-7}\cdot x + 4.71\cdot 10^{-3}$  try-ssr-rewrite?-noop-real

 $4.63\cdot 10^{-7}\cdot x + 2.67\cdot 10^{-4}$ 

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-noop-

rewrite-strat-bottomup-noop-

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

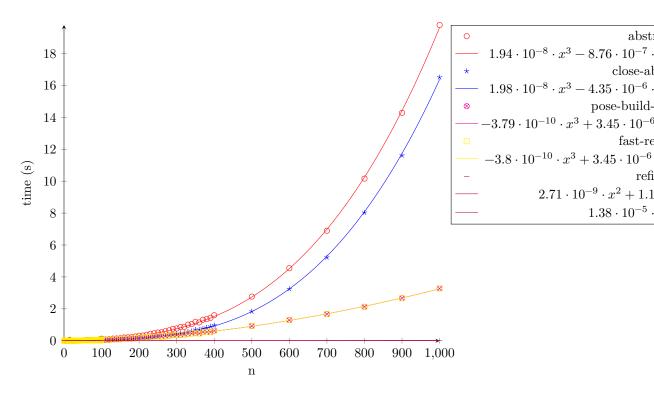
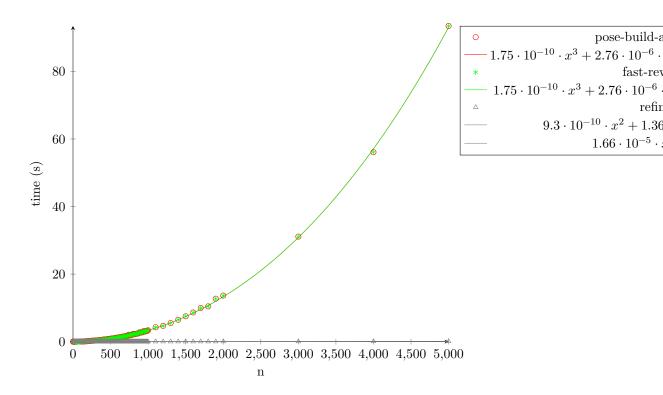


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

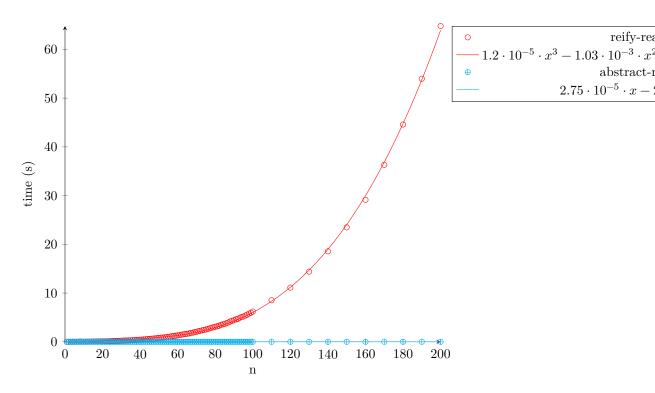


Figure 13: timing-typeclass-reification-let-in-HOAS

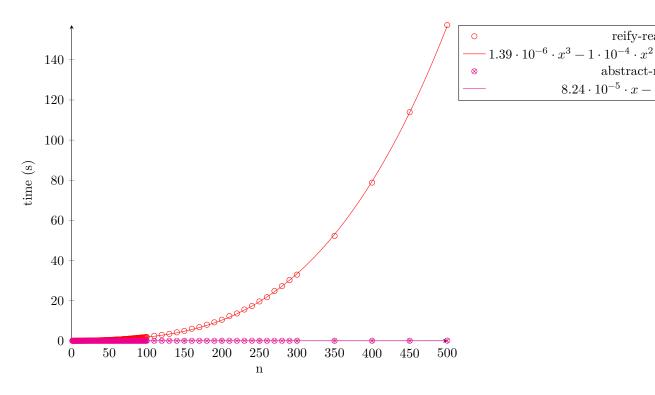


Figure 14: timing-typeclass-reification-let-in-PHOAS