

Figure 1: timing-pattern

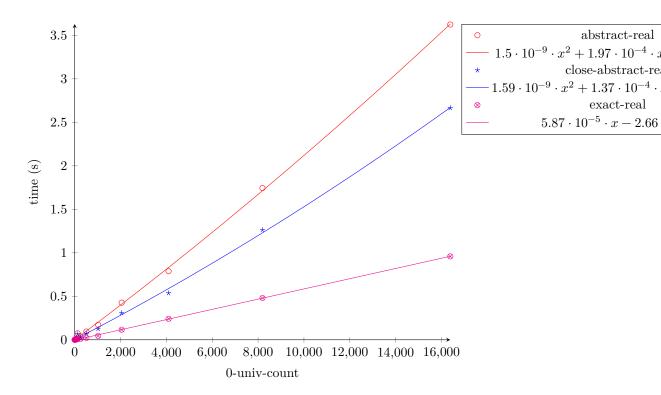


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

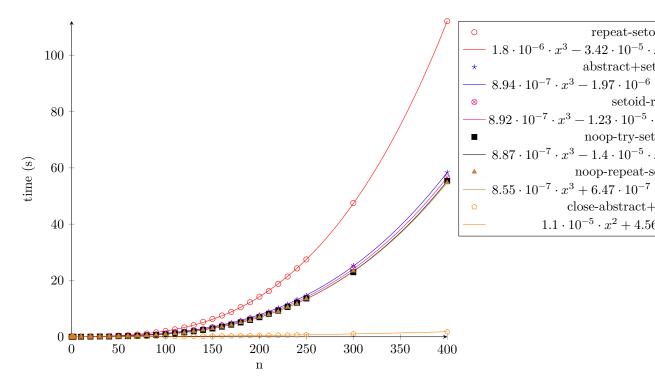
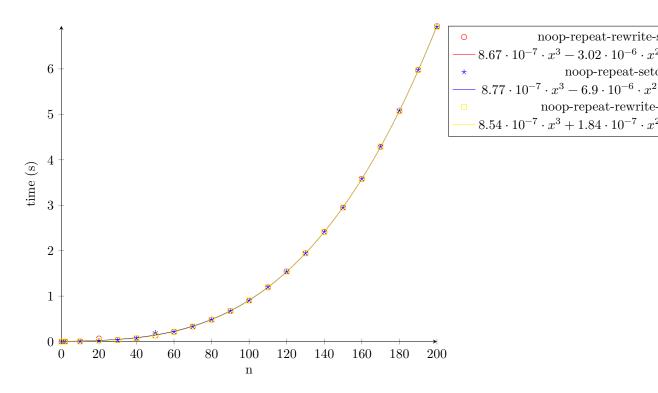
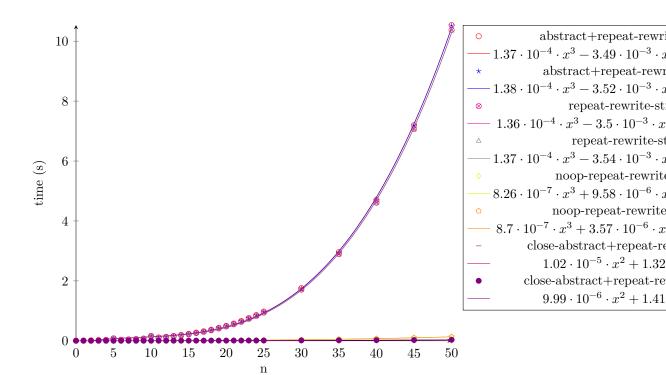


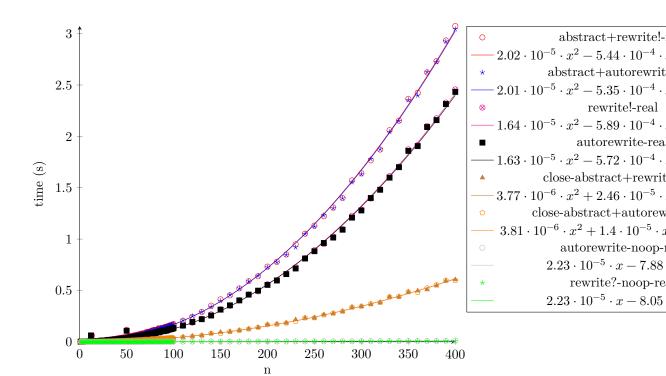
Figure 3: timing-repeat-setoid-rewrite-under-binders



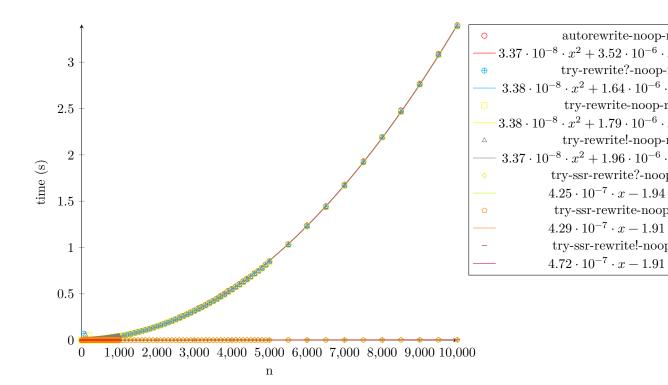
 $Figure\ 4:\ timing-repeat-setoid-rewrite-under-binders-noop$ 



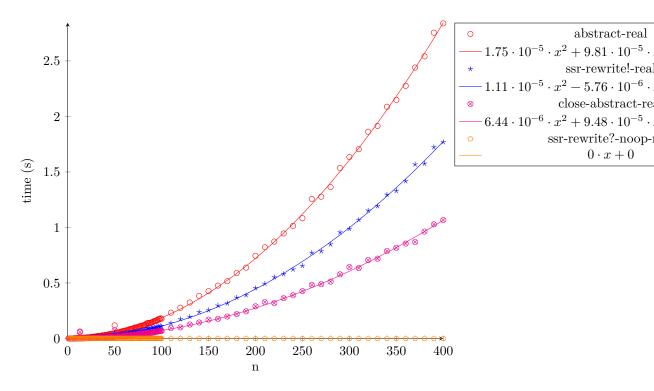
 $Figure\ 5:\ timing-rewrite-strat-under-binders$ 



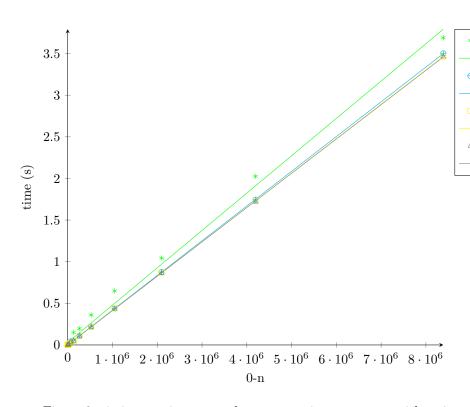
 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$ 



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



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



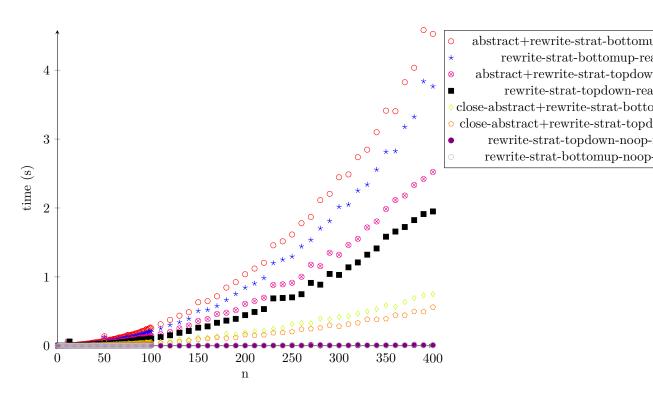
try-ssr-rewrite!-cold-noop-rea

 $4.49 \cdot 10^{-7} \cdot x + 2.89 \cdot 10^{-2}$  try-ssr-rewrite!-noop-real  $4.17 \cdot 10^{-7} \cdot x + 4.92 \cdot 10^{-4}$ 

 $\begin{array}{l} \text{try-ssr-rewrite-noop-real} \\ 4.13 \cdot 10^{-7} \cdot x - 9.45 \cdot 10^{-5} \end{array}$ 

try-ssr-rewrite?-noop-real  $4.12\cdot 10^{-7}\cdot x - 3.03\cdot 10^{-5}$ 

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

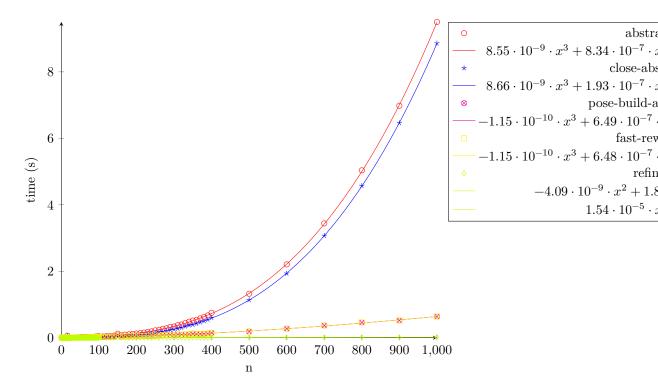


 $abstract + rewrite - strat - bottom \\ \\$ rewrite-strat-bottomup-real

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

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

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



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

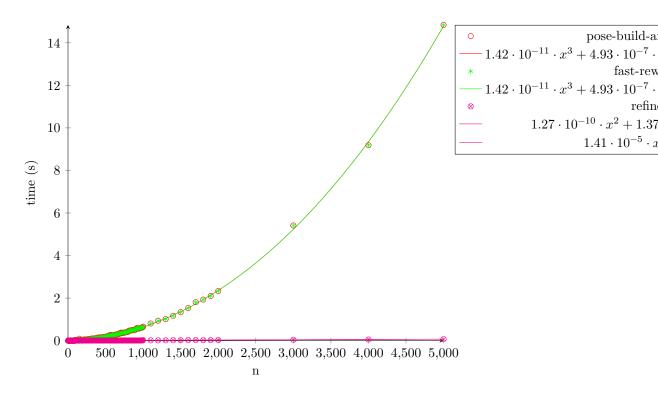
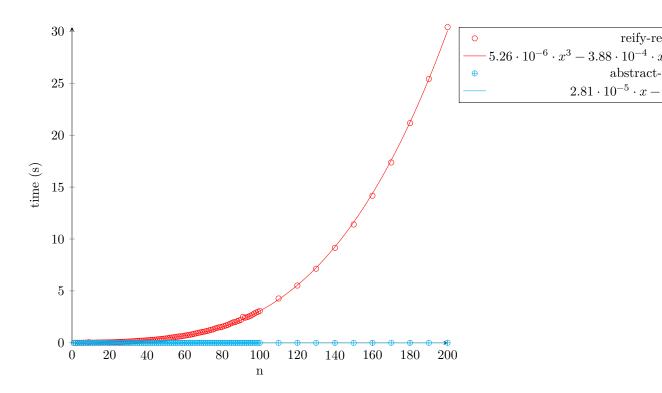
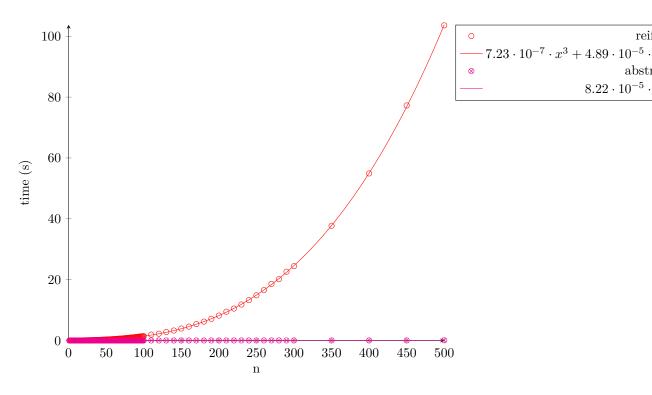


Figure 12: timing-rewrite-repeated-app-fast-rewrite-no-abstract



 $Figure \ 13: \ timing-type class-reification-let-in-HOAS$ 



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

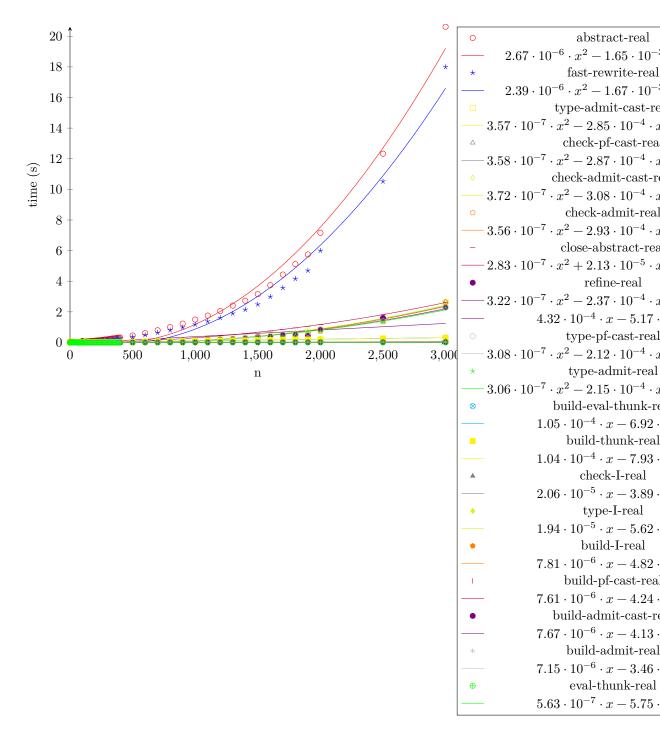


Figure 15: timing-rewrite-repeated-app-fast-rewrite-ltac2