

Figure 1: timing-pattern

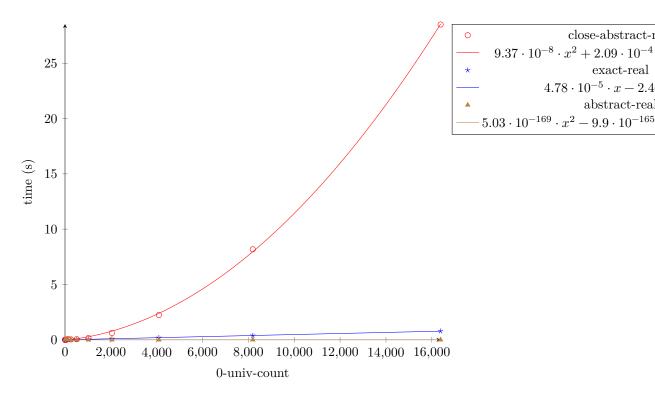


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 

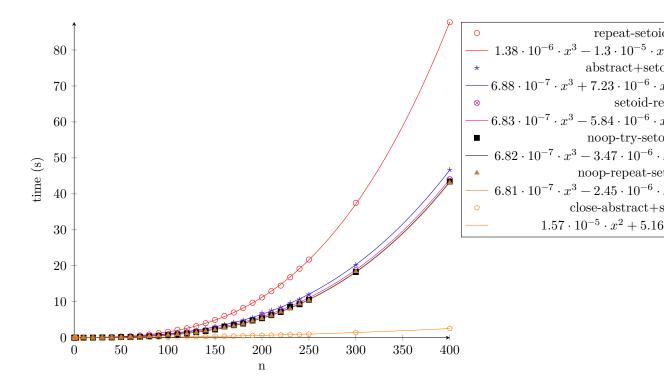
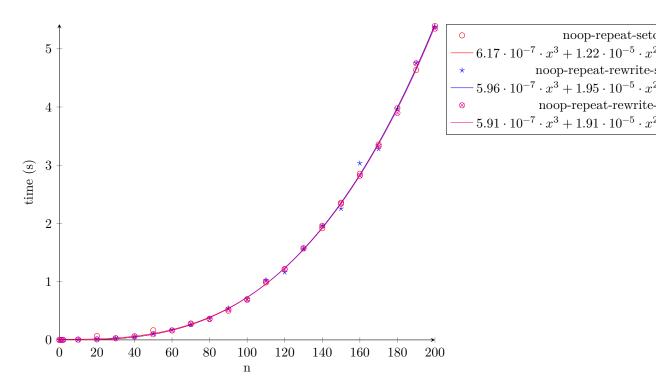
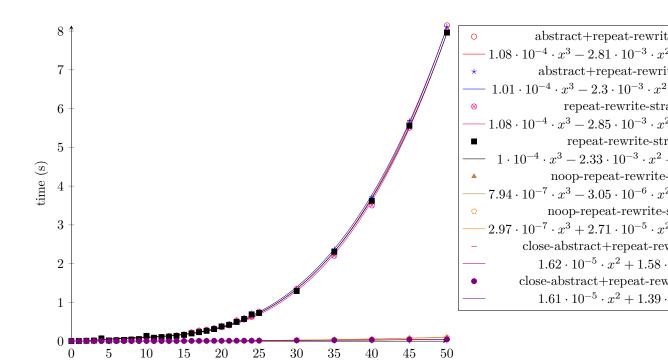


Figure 3: timing-repeat-setoid-rewrite-under-binders

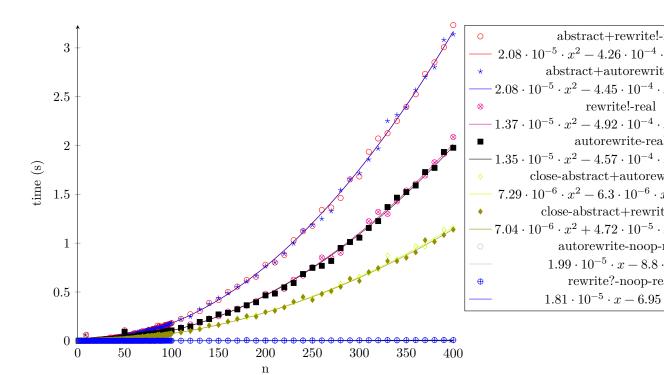


 $Figure\ 4:\ timing-repeat-setoid-rewrite-under-binders-noop$ 

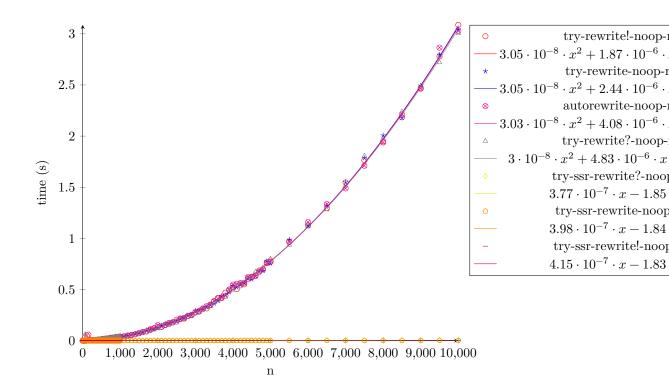


 $Figure \ 5: \ timing-rewrite-strat-under-binders$ 

n



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



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

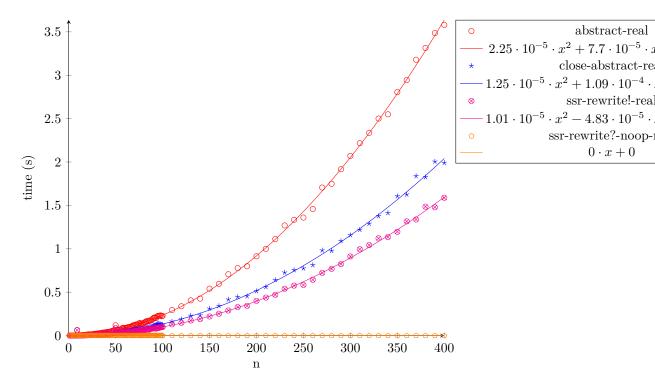
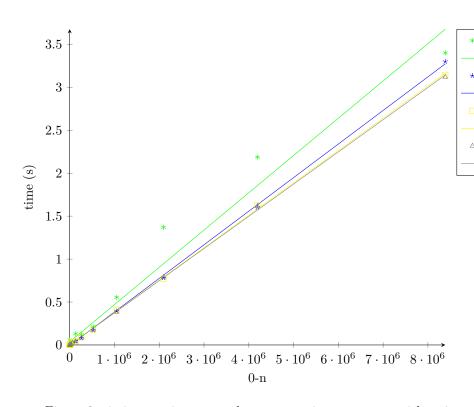


Figure 8: timing-rewrite-repeated-app-ssrrewrite



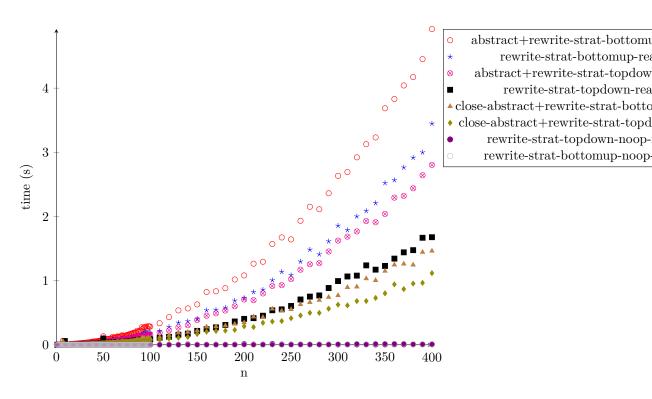
try-ssr-rewrite!-cold-noop-rea

 $\begin{array}{l} 4.34\cdot 10^{-7}\cdot x + 3.62\cdot 10^{-2}\\ \text{try-ssr-rewrite-noop-real} \end{array}$ 

 $\begin{aligned} &3.91 \cdot 10^{-7} \cdot x - 6.61 \cdot 10^{-3} \\ &\text{try-ssr-rewrite!-noop-real} \\ &3.77 \cdot 10^{-7} \cdot x + 2.42 \cdot 10^{-4} \end{aligned}$ 

try-ssr-rewrite?-noop-real  $3.75\cdot 10^{-7}\cdot x - 1.57\cdot 10^{-3}$ 

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



rewrite-strat-bottomup-realabstract + rewrite - strat - topdow

rewrite-strat-topdown-rea

rewrite-strat-topdown-noop-

rewrite-strat-bottomup-noop-

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

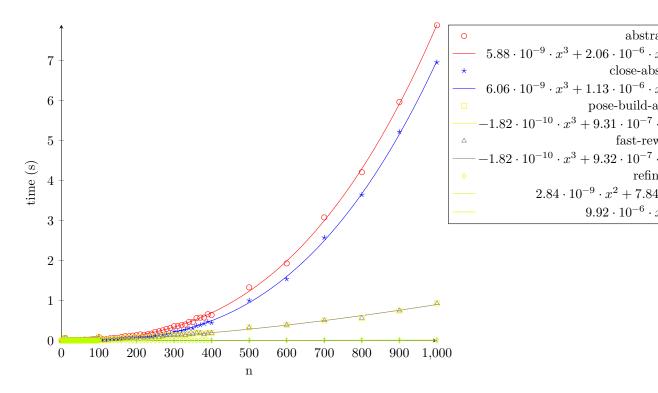
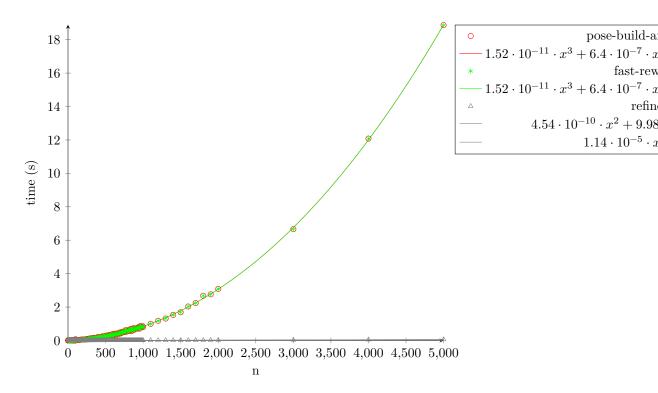


Figure 11: timing-rewrite-repeated-app-fast-rewrite



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

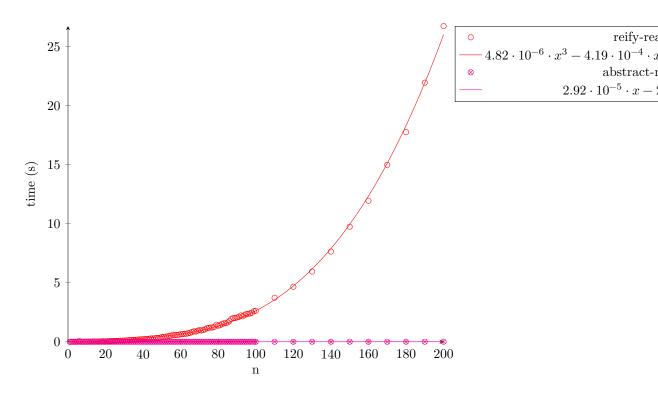
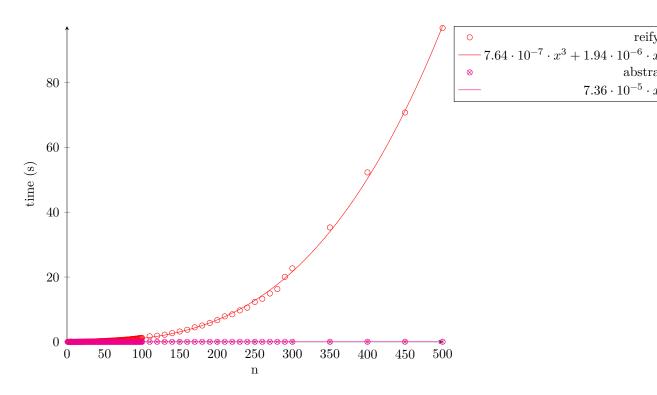


Figure 13: timing-typeclass-reification-let-in-HOAS



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