

Figure 1: timing-pattern

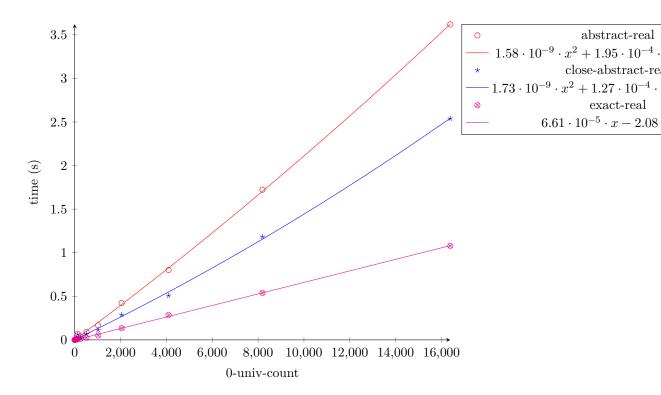
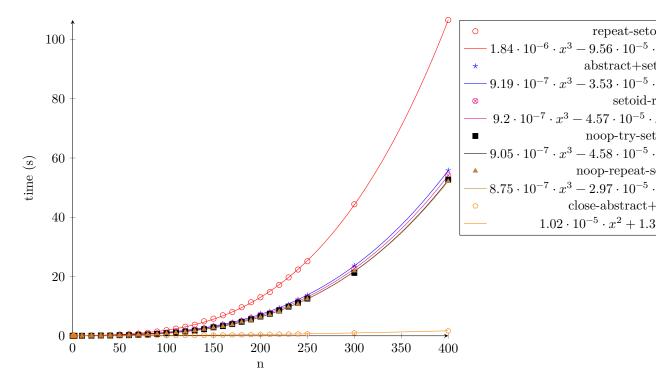


Figure 2: timing-n-polymorphic-universes param-1-n  $\,0\,$ 



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

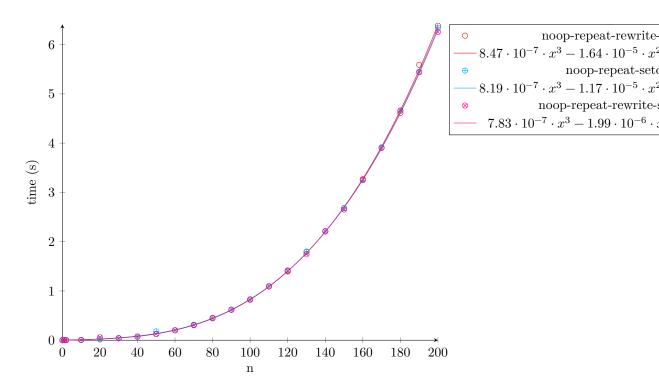


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

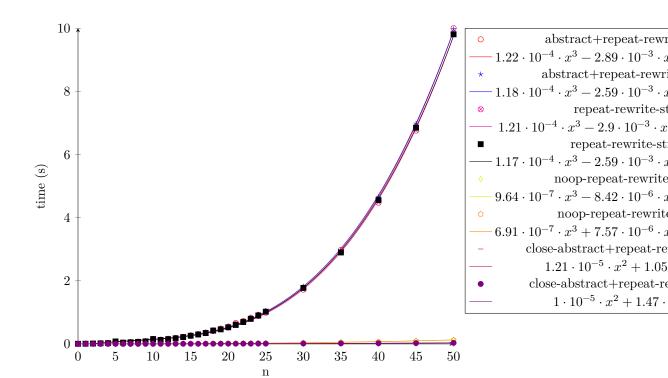
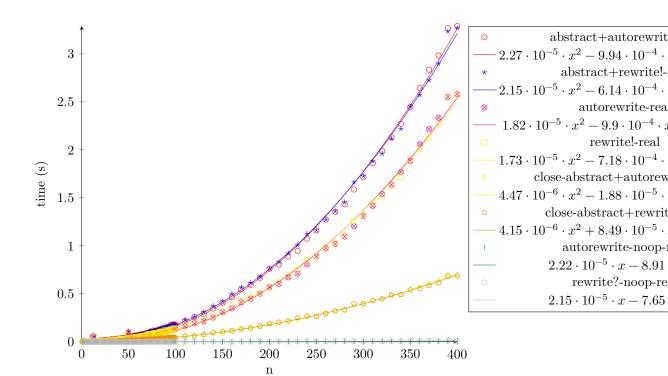
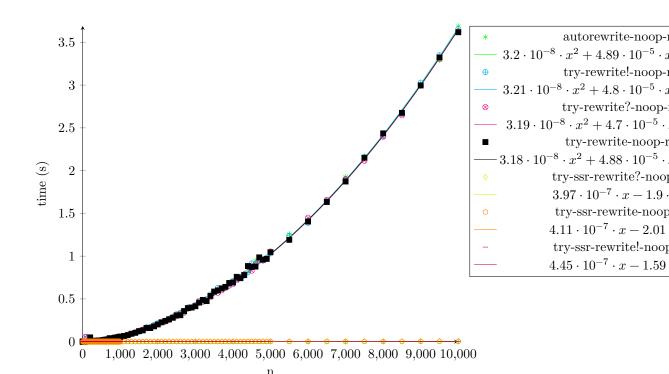


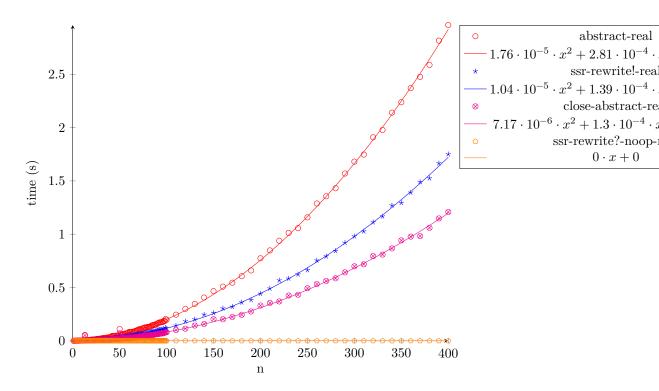
Figure 5: timing-rewrite-strat-under-binders



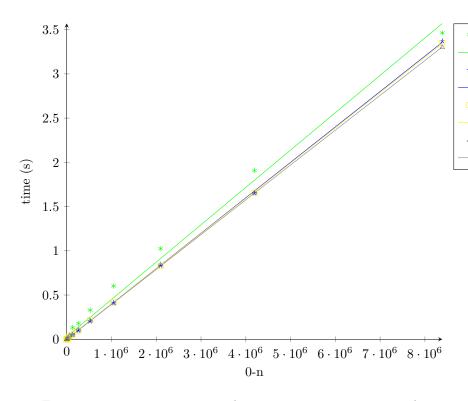
 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$ 



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



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

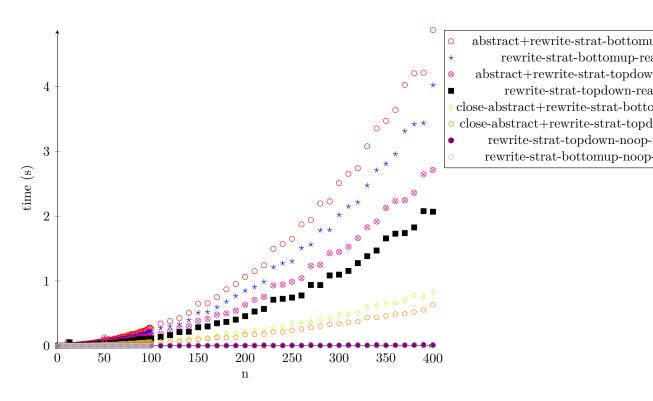


try-ssr-rewrite!-cold-noop-rea  $4.22 \cdot 10^{-7} \cdot x + 2.75 \cdot 10^{-2}$  try-ssr-rewrite-noop-real

 $\begin{array}{l} 4\cdot 10^{-7}\cdot x - 1.85\cdot 10^{-3}\\ \text{try-ssr-rewrite?-noop-real} \end{array}$ 

 $\begin{aligned} &3.98 \cdot 10^{-7} \cdot x + 9.41 \cdot 10^{-5} \\ &\text{try-ssr-rewrite!-noop-real} \\ &3.94 \cdot 10^{-7} \cdot x + 1.19 \cdot 10^{-3} \end{aligned}$ 

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



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

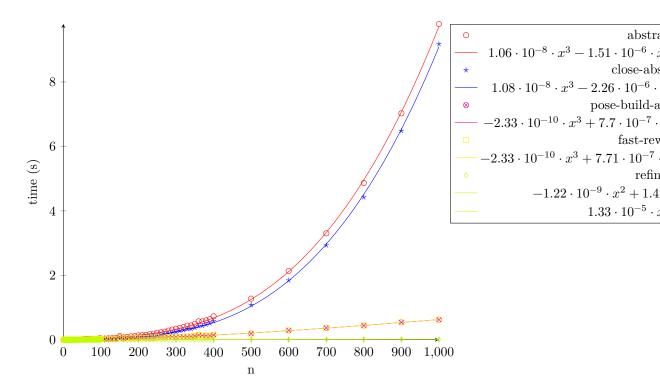
abstract + rewrite - strat - topdow

rewrite-strat-topdown-rea

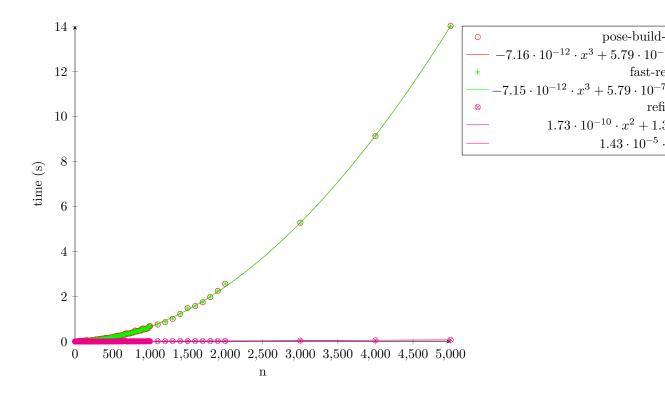
rewrite-strat-topdown-noop-

rewrite-strat-bottomup-noop-

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



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



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

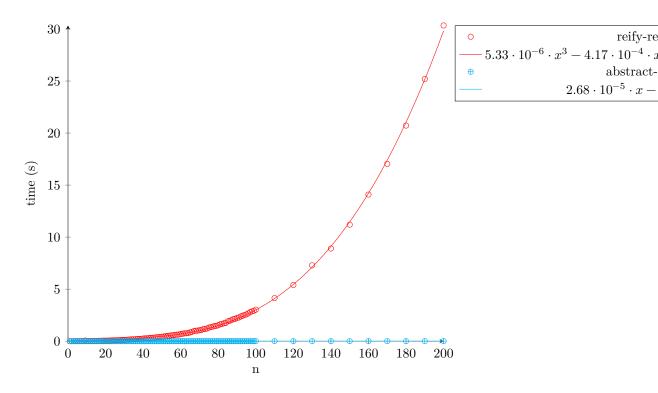
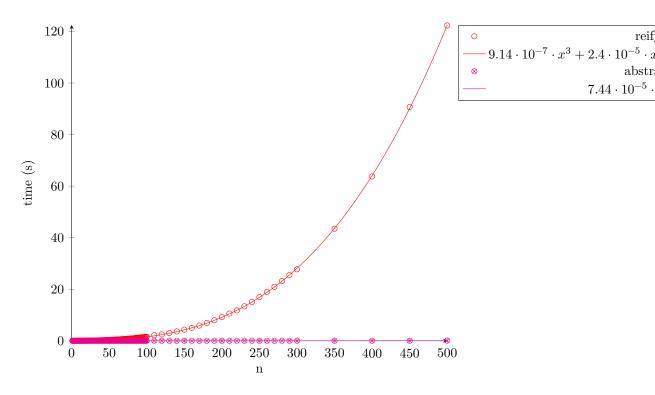


Figure 13: timing-typeclass-reification-let-in-HOAS



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

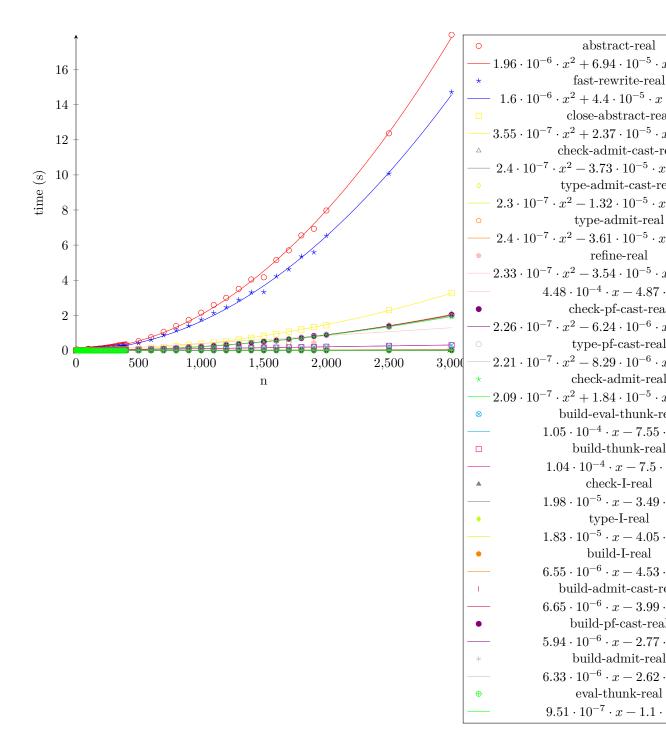


Figure 15: timing-rewrite-repeated-app-fast-rewrite-ltac2