

Figure 1: timing-pattern

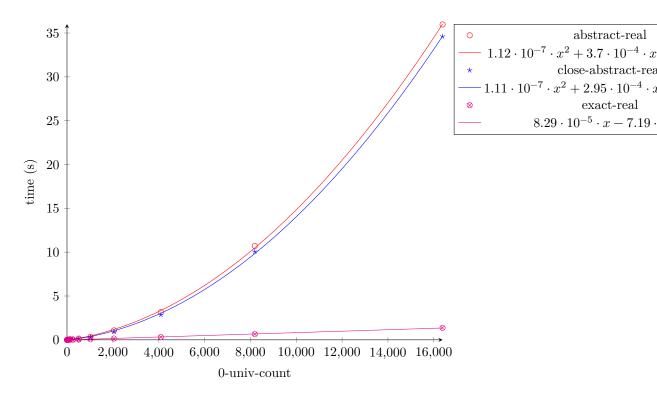
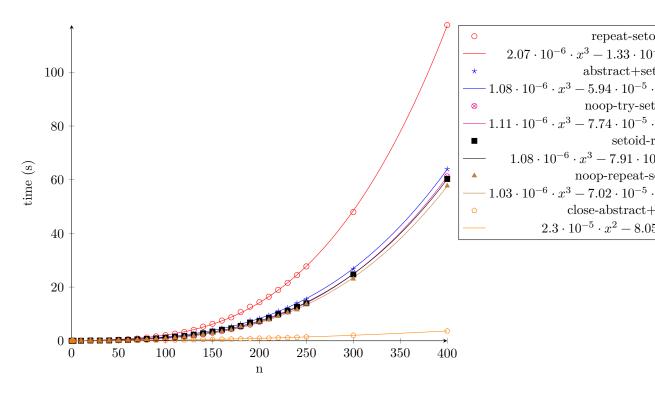
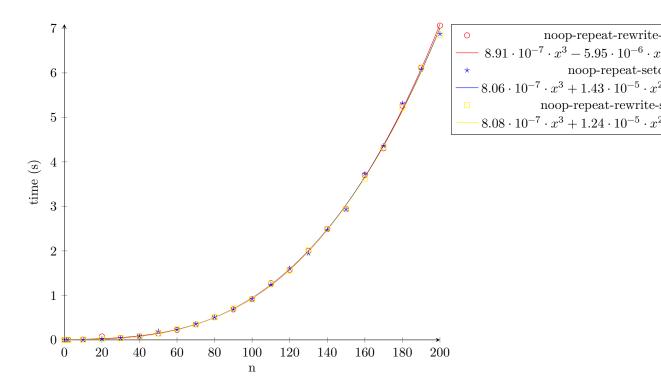


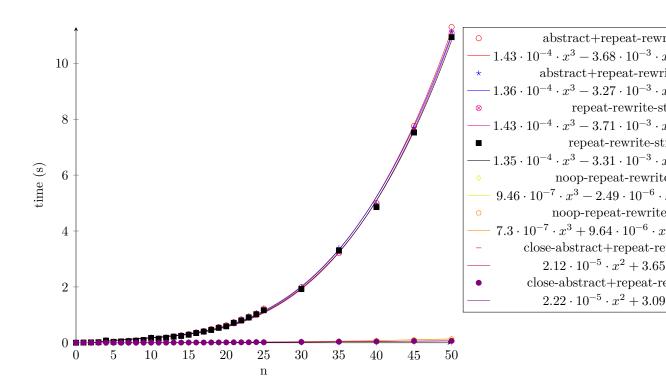
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



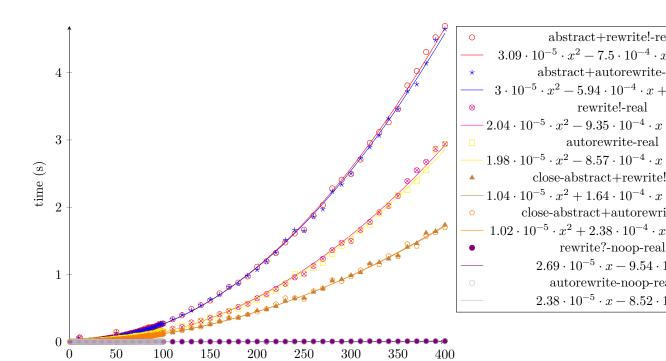
 $Figure \ 3: \ timing-repeat-setoid-rewrite-under-binders$



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

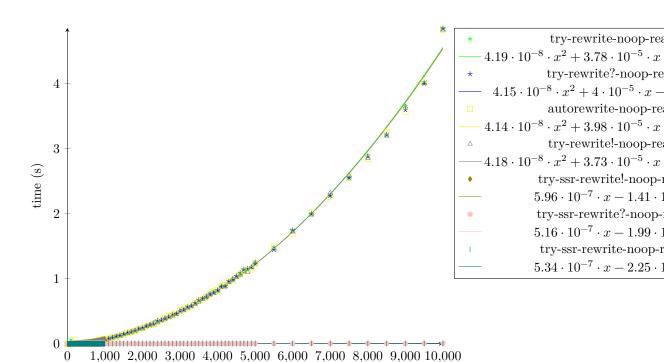


 $Figure\ 5:\ timing-rewrite-strat-under-binders$

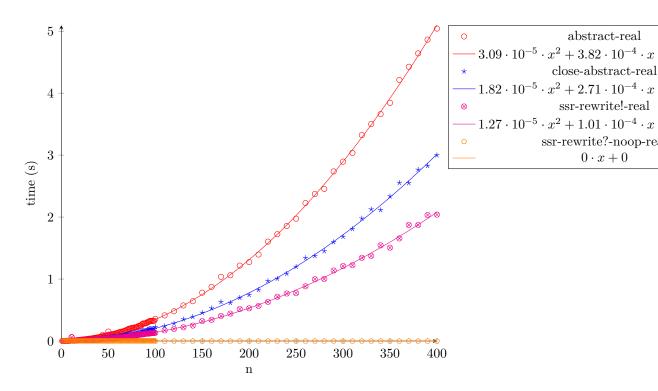


 $Figure \ 6: \ timing-rewrite-repeated-app-autorewrite \\$

n



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



 ${\bf Figure~8:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}ssrrewrite}$

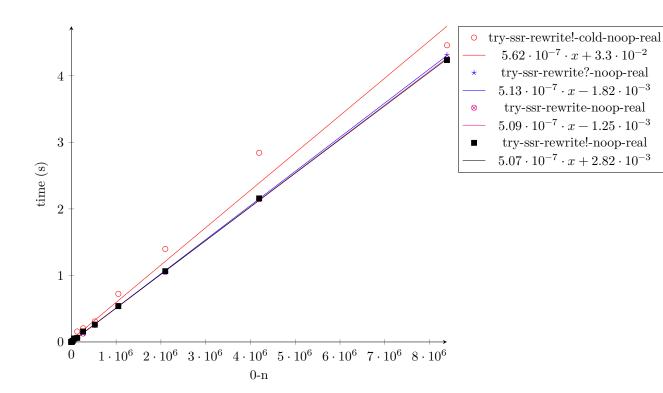
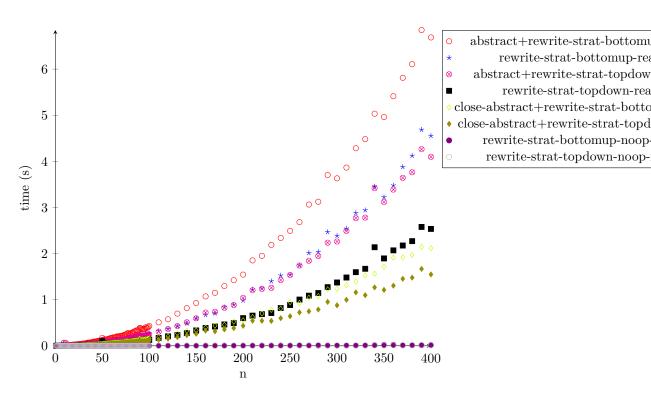


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$

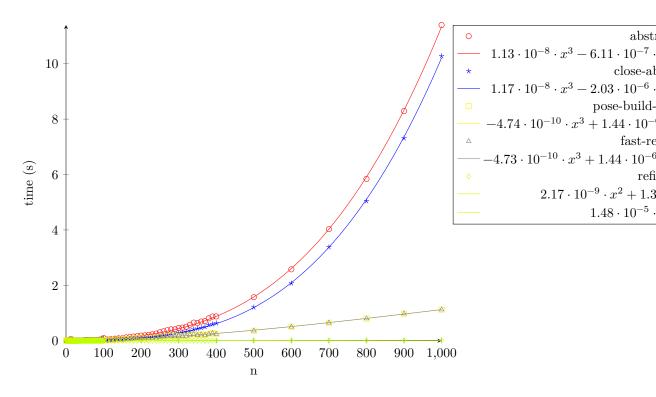


rewrite-strat-bottomup-rea

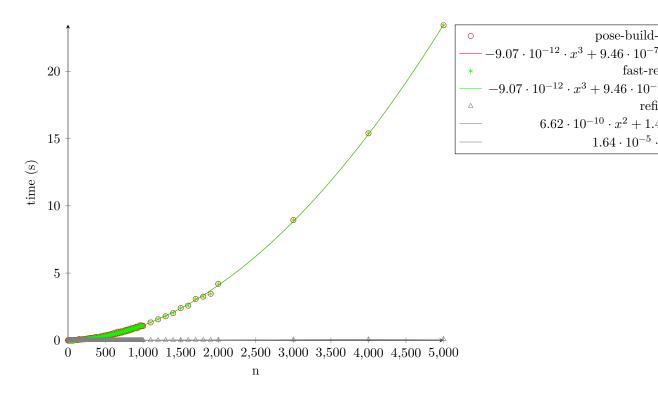
abstract + rewrite - strat - topdowrewrite-strat-topdown-rea

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

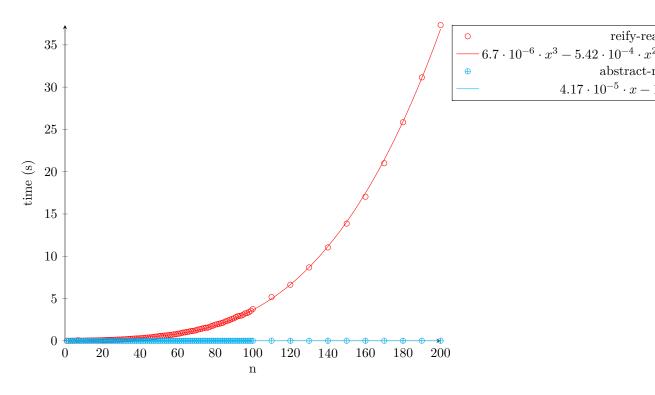
 $Figure~10:~timing\mbox{-rewrite-repeated-app-rewrite-strat}$



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



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



 ${\bf Figure~13:~timing-type class-reification-let-in-HOAS}$

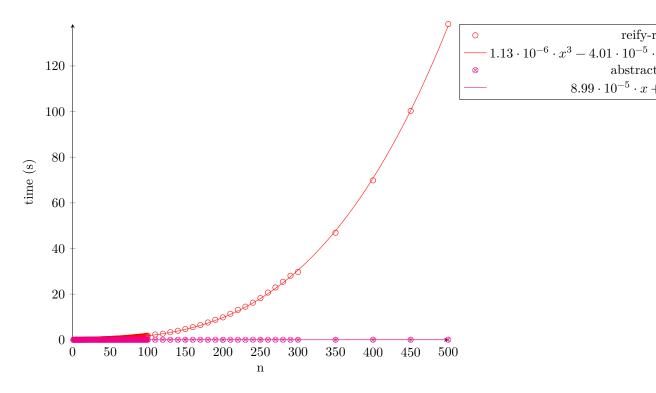


Figure 14: timing-typeclass-reification-let-in-PHOAS

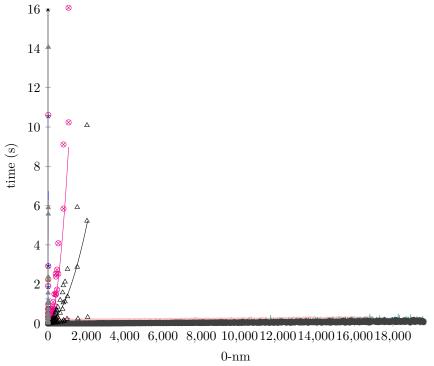


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

rewrite-strat(bottomup-bot $6.99 \cdot 10^{-3} \exp{(0.45 \cdot ($ rewrite-strat(topdown-bot $7.28 \cdot 10^{-3} exp (0.46 \cdot ($ cps+cbn-real $7.83 \cdot 10^{-6} \cdot x^2 - 8.91 \cdot 10^{-5} \cdot x^2$ cps+vm-compute- $2.04 \cdot 10^{-10} \cdot x^2 + 5.95 \cdot 10^{-6} \cdot$ cps+native-compute $8.22 \cdot 10^{-11} \cdot x^2 + 5.71 \cdot 10^{-6} \cdot$ cps+lazy-real $2.5 \cdot 10^{-10} \cdot x^2 + 4.4 \cdot 10^{-6} \cdot x$ cps+cbv-real $1.2 \cdot 10^{-10} \cdot x^2 + 3.52 \cdot 10^{-6} \cdot x^2$ cps+simpl-real $1.03 \cdot 10^{-6} \cdot x^2 + 4.05 \cdot 10^{-4} \cdot x^2 + 4.05 \cdot 10^{-4}$ setoid-rewrite-re $-8.22 \cdot 10^{-3} \cdot x^3 + 0.26 \cdot x^2 - \\$

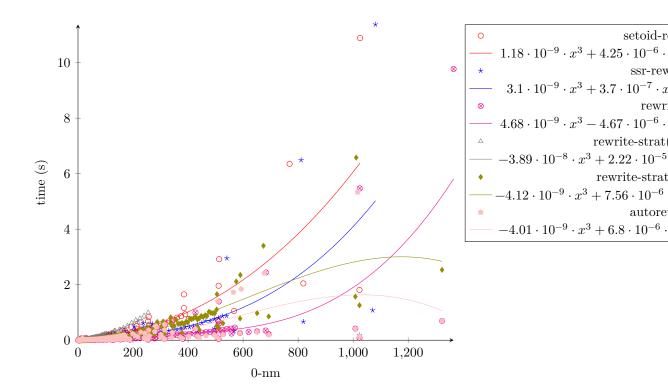
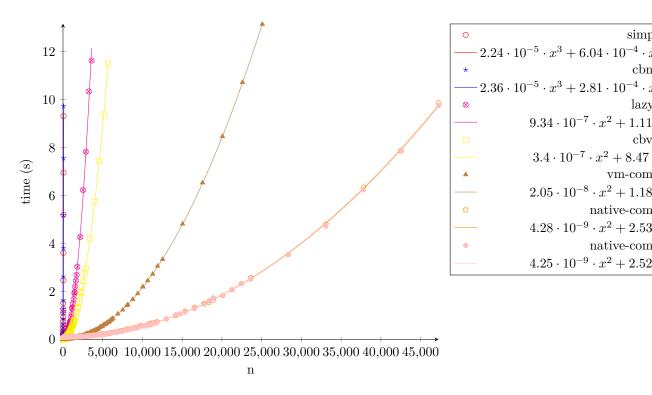


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



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 $9.34 \cdot 10^{-7} \cdot x^2 + 1.11$

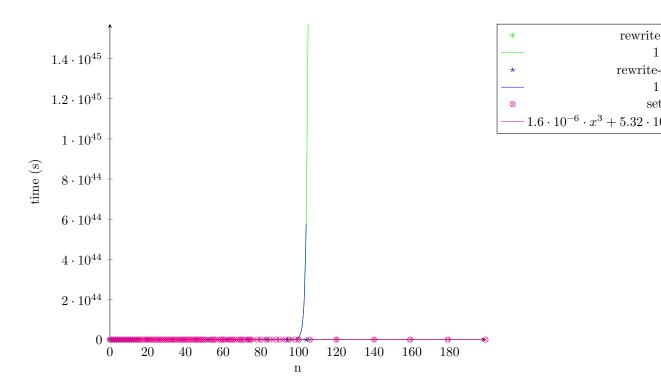
 $3.4 \cdot 10^{-7} \cdot x^2 + 8.47$

 $2.05 \cdot 10^{-8} \cdot x^2 + 1.18$

 $4.28 \cdot 10^{-9} \cdot x^2 + 2.53$

 $4.25 \cdot 10^{-9} \cdot x^2 + 2.52$

Figure 17: timing-sieve-of-eratosthenes



rewrite

rewrite-

Figure 18: timing-rewrite-under-lets-plus-0 $\,$

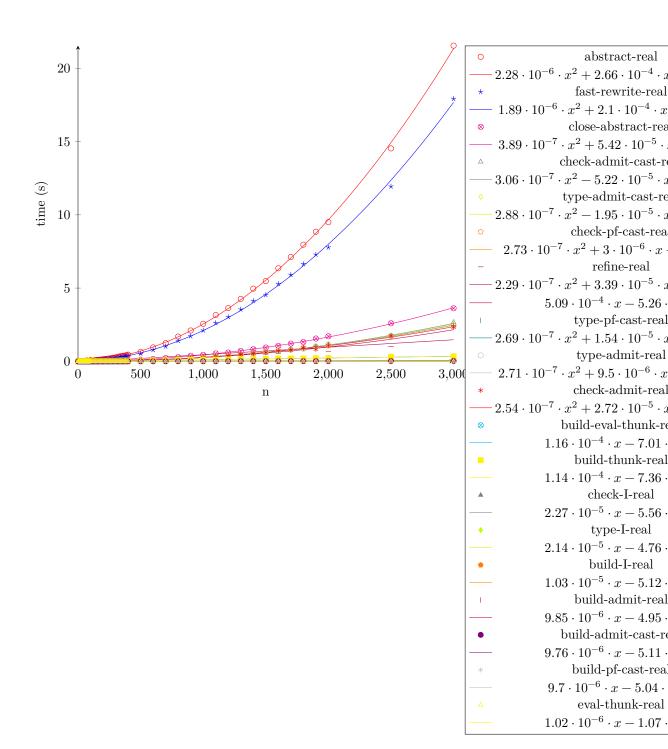


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2