

Figure 1: timing-pattern

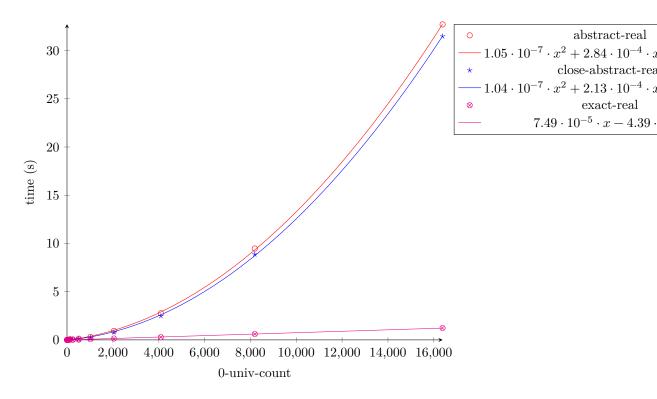
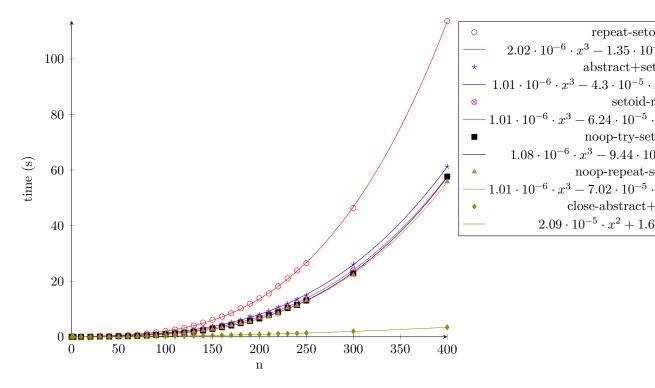
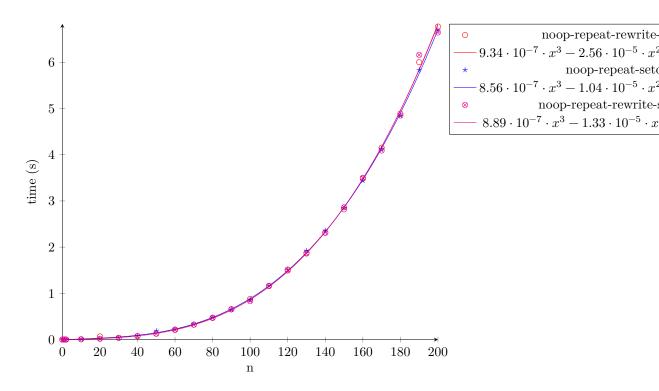


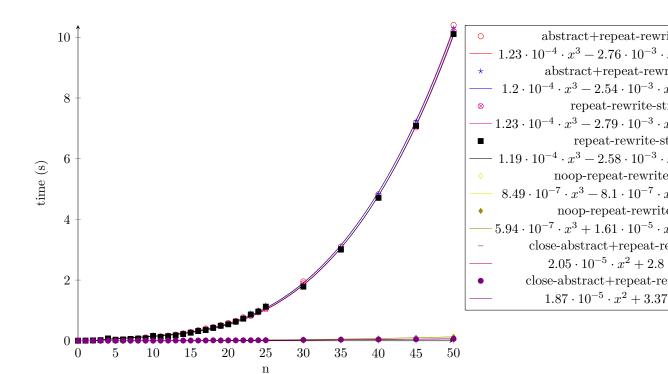
Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



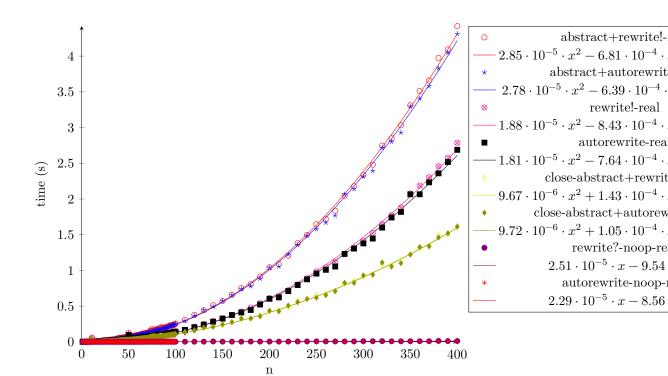
 $Figure \ 3: \ timing-repeat-setoid-rewrite-under-binders$



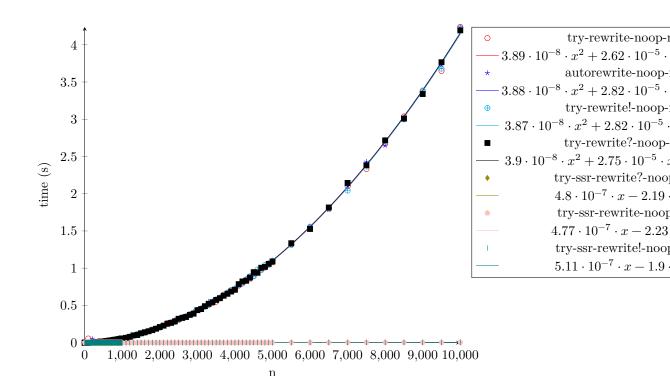
 $Figure \ 4: \ timing-repeat-setoid-rewrite-under-binders-noop \\$



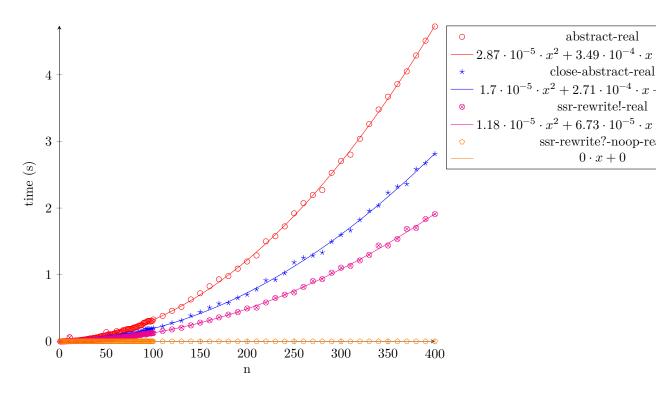
 $Figure\ 5:\ timing-rewrite-strat-under-binders$



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



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



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

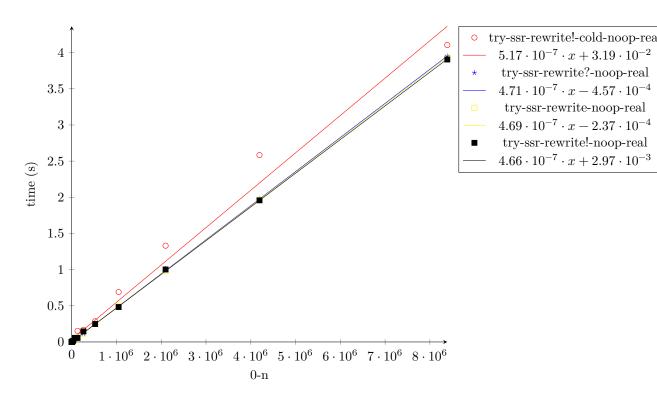
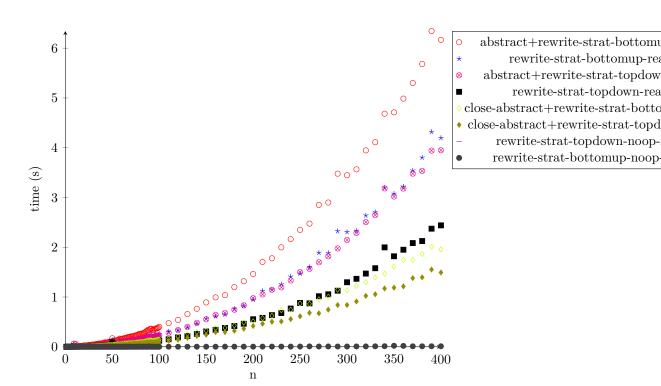


Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$



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

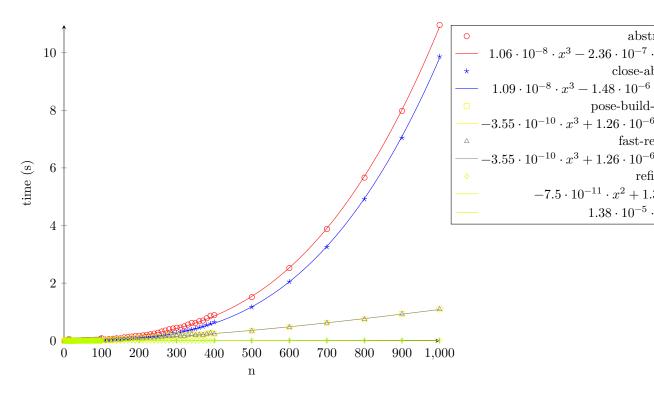
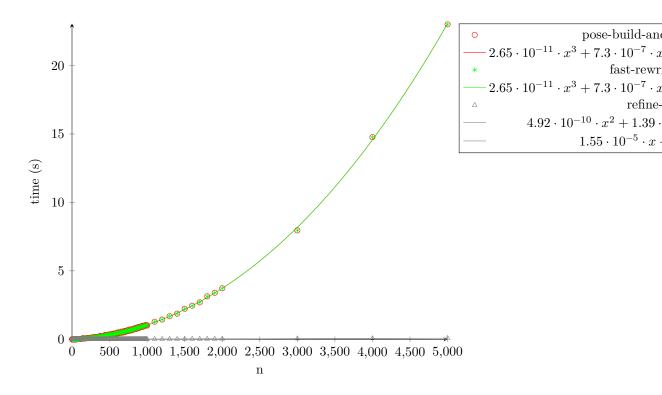


Figure 11: timing-rewrite-repeated-app-fast-rewrite



 ${\bf Figure~12:~timing\text{-}rewrite\text{-}repeated\text{-}app\text{-}fast\text{-}rewrite\text{-}no\text{-}abstract}}$

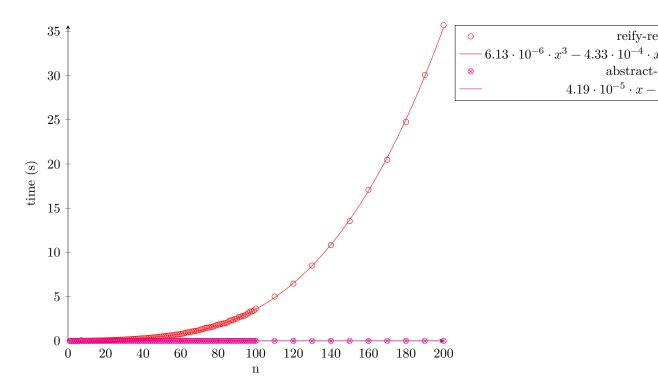


Figure 13: timing-typeclass-reification-let-in-HOAS

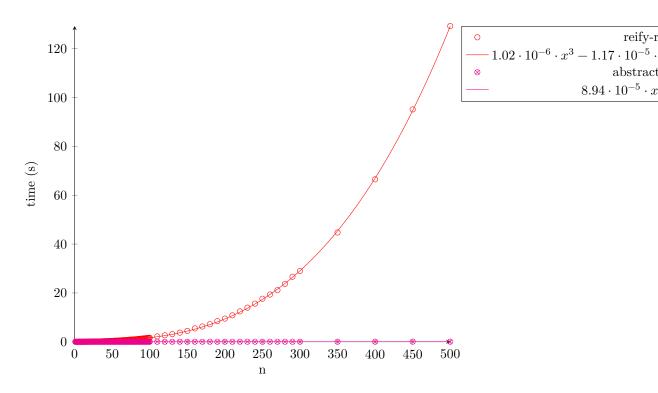


Figure 14: timing-typeclass-reification-let-in-PHOAS

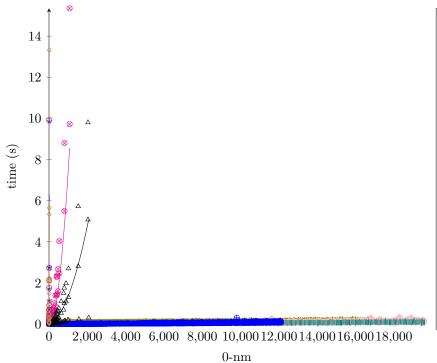


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

rewrite-strat(bottomup-bot $6.34 \cdot 10^{-3} exp (0.46 \cdot ($ rewrite-strat(topdown-bot $6.66 \cdot 10^{-3} \exp{(0.46 \cdot ($ cps+cbn-real $7.45\cdot 10^{-6}\cdot x^2 - 6.07\cdot 10^{-5}\cdot x^2 - 6.07\cdot 1$ cps+native-compute $1.27 \cdot 10^{-10} \cdot x^2 + 4.83 \cdot 10^{-6} \cdot$ cps+lazy-real $2.26 \cdot 10^{-10} \cdot x^2 + 4.39 \cdot 10^{-6} \cdot$ $\operatorname{cps+cbv-real}$ $1.12 \cdot 10^{-10} \cdot x^2 + 3.42 \cdot 10^{-6} \cdot$ cps+vm-compute- $2.1 \cdot 10^{-10} \cdot x^2 + 5.96 \cdot 10^{-6} \cdot x^2$ cps+simpl-real $1.02 \cdot 10^{-6} \cdot x^2 + 3.45 \cdot 10^{-4} \cdot x^2$ setoid-rewrite-re $-7.76 \cdot 10^{-3} \cdot x^3 + 0.25 \cdot x^2 -$

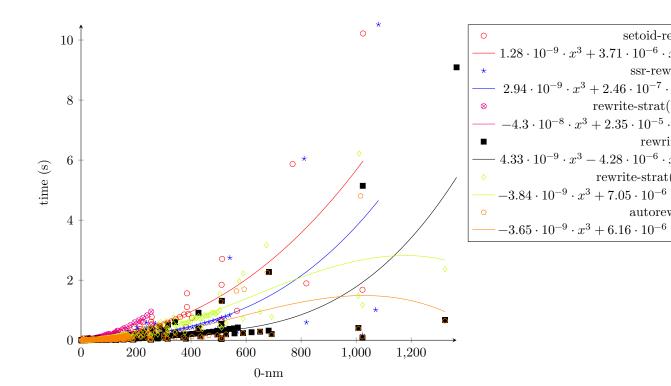
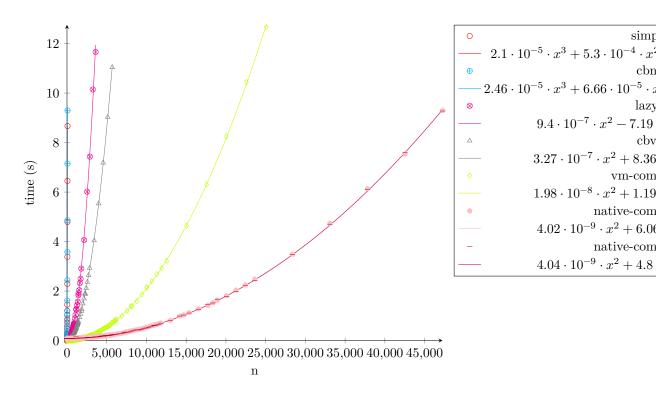


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



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 $9.4 \cdot 10^{-7} \cdot x^2 - 7.19$

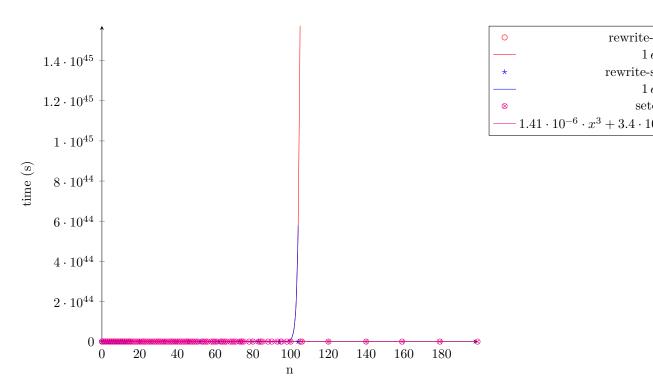
 $3.27 \cdot 10^{-7} \cdot x^2 + 8.36$

 $1.98 \cdot 10^{-8} \cdot x^2 + 1.19$

 $4.02 \cdot 10^{-9} \cdot x^2 + 6.06$

 $4.04 \cdot 10^{-9} \cdot x^2 + 4.8$

Figure 17: timing-sieve-of-eratosthenes



rewrite-

rewrite-s

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

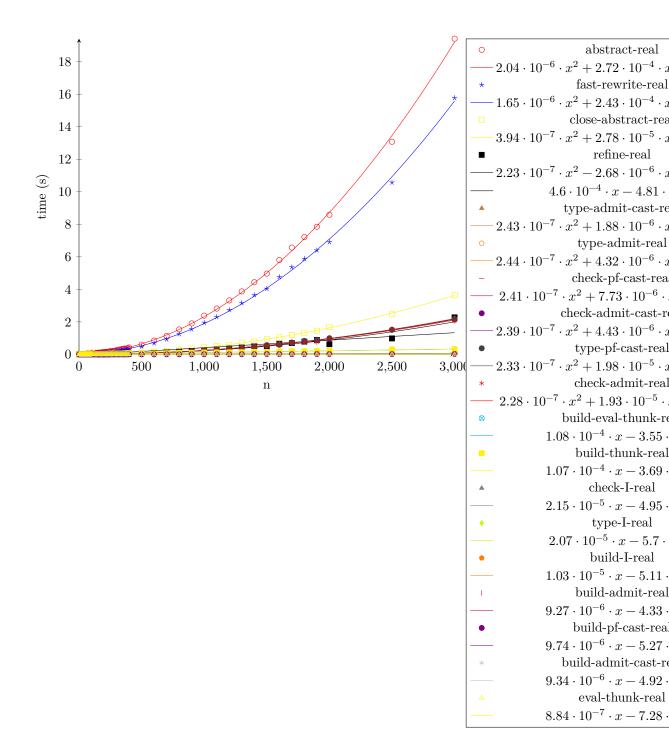


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2