

Figure 1: timing-pattern

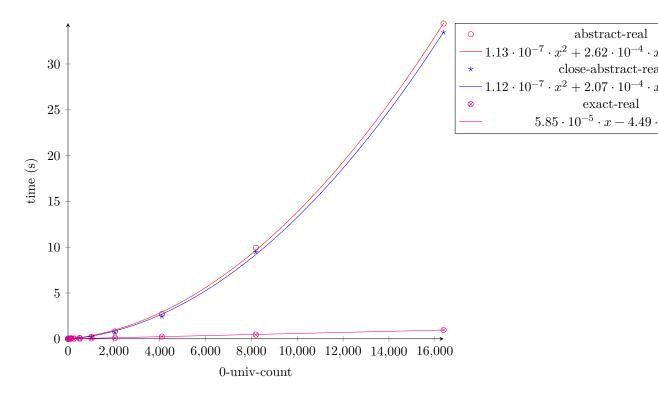


Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$

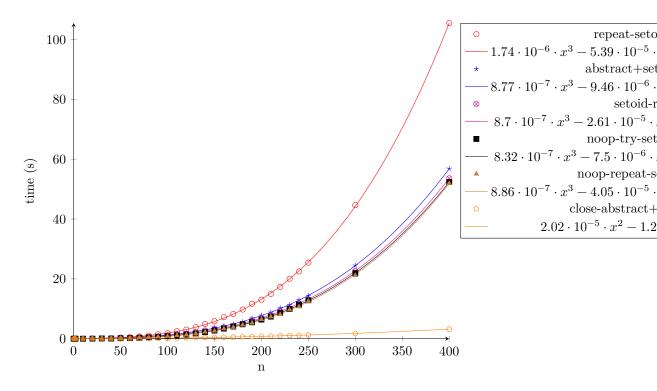


Figure 3: timing-repeat-setoid-rewrite-under-binders

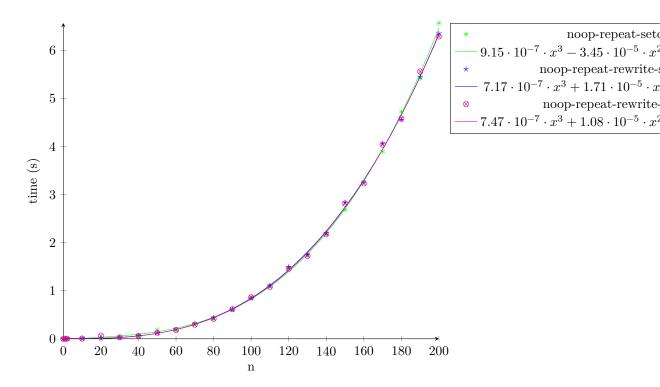


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop

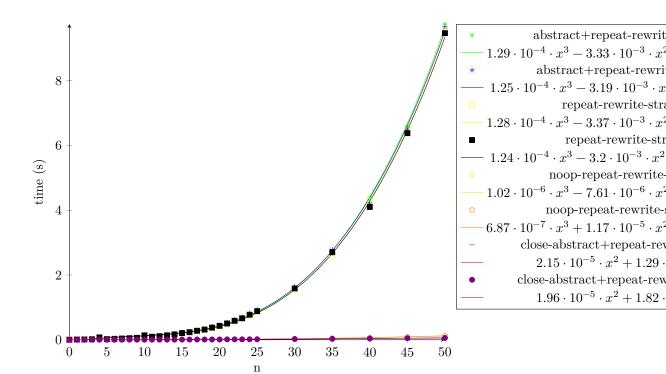


Figure 5: timing-rewrite-strat-under-binders

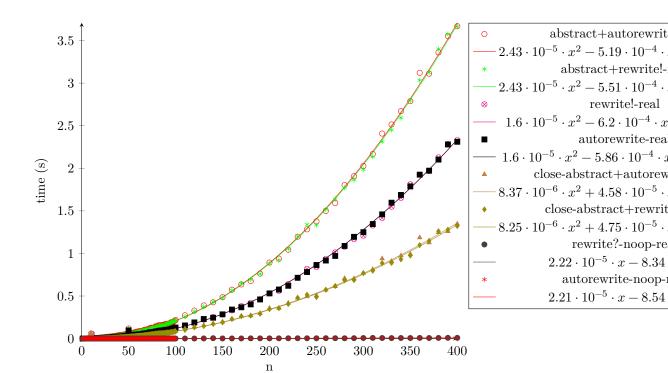


Figure 6: timing-rewrite-repeated-app-autorewrite

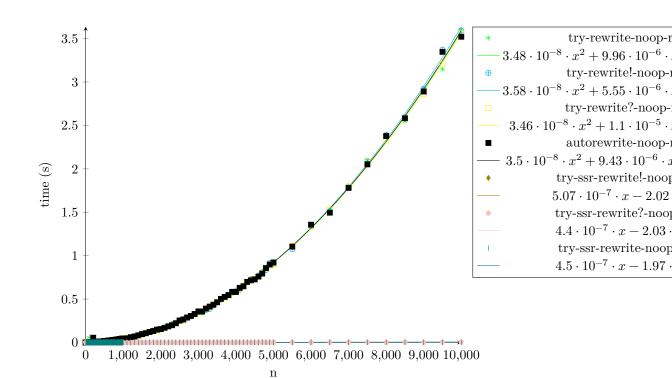
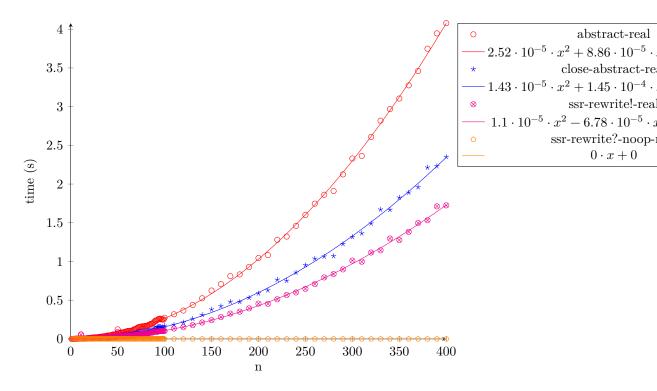
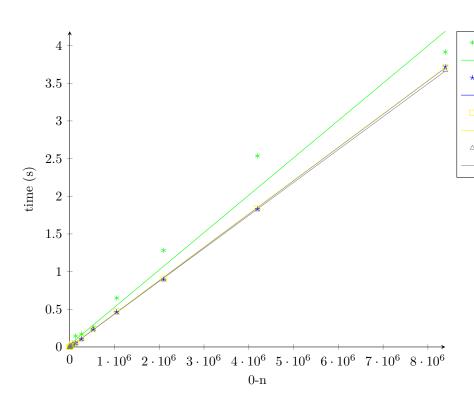


Figure 7: timing-rewrite-repeated-app-autorewrite-noop



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



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

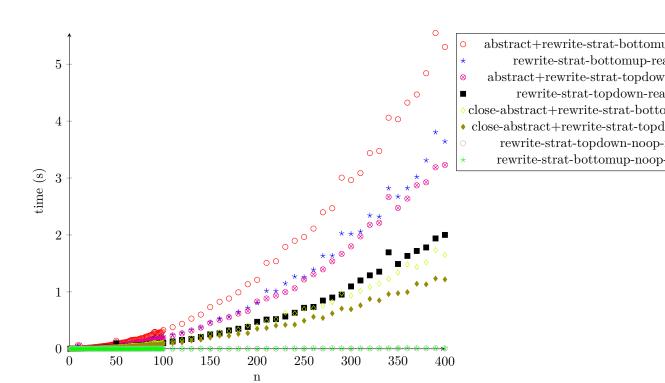
 $\begin{array}{l} 4.96\cdot 10^{-7}\cdot x + 3.13\cdot 10^{-2}\\ \text{try-ssr-rewrite-noop-real} \end{array}$

 $\begin{array}{l} 4.42\cdot 10^{-7}\cdot x - 3.05\cdot 10^{-3}\\ \text{try-ssr-rewrite!-noop-real} \end{array}$

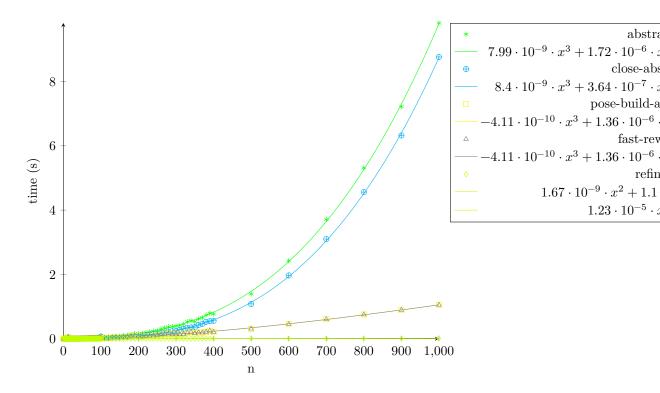
 $\begin{array}{l} 4.42\cdot 10^{-7}\cdot x - 1.53\cdot 10^{-4}\\ \text{try-ssr-rewrite?-noop-real} \end{array}$

 $4.37 \cdot 10^{-7} \cdot x - 1.95 \cdot 10^{-3}$

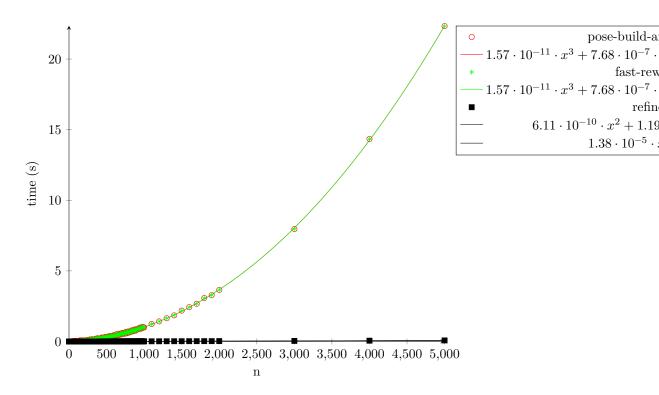
Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$



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



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



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

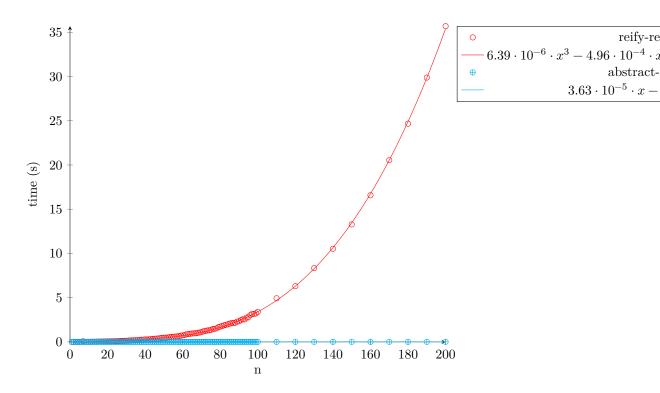


Figure 13: timing-typeclass-reification-let-in-HOAS

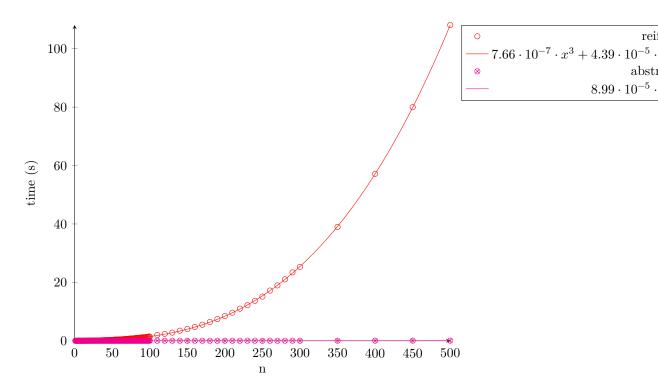


Figure 14: timing-typeclass-reification-let-in-PHOAS

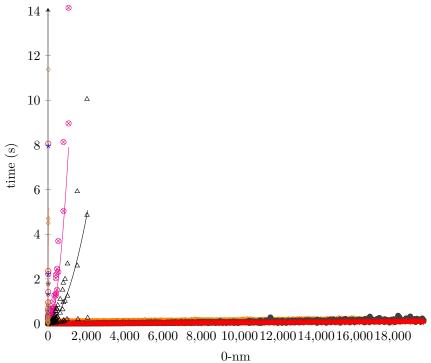


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

rewrite-strat(topdown-bot $5.28 \cdot 10^{-3} exp (0.46 \cdot ($ rewrite-strat(bottomup-bot $4.83 \cdot 10^{-3} exp(0.46 \cdot ($ cps+cbn-real $6.87 \cdot 10^{-6} \cdot x^2 - 6.36 \cdot 10^{-5} \cdot x^2 + 6.36 \cdot 10^{-5} \cdot x^2$ cps+vm-compute- $1.93\cdot 10^{-10}\cdot x^2 + 5.33\cdot 10^{-6}\cdot \\$ cps+native-compute $4.79 \cdot 10^{-11} \cdot x^2 + 5.87 \cdot 10^{-6} \cdot$ cps+lazy-real $2.43 \cdot 10^{-10} \cdot x^2 + 3.71 \cdot 10^{-6}$ cps+cbv-real $9.96 \cdot 10^{-11} \cdot x^2 + 3.4 \cdot 10^{-6}$ cps+simpl-real $1.03 \cdot 10^{-6} \cdot x^2 + 3.16 \cdot 10^{-4} \cdot$ setoid-rewrite-re $-6.6 \cdot 10^{-3} \cdot x^3 + 0.21 \cdot x^2 -$

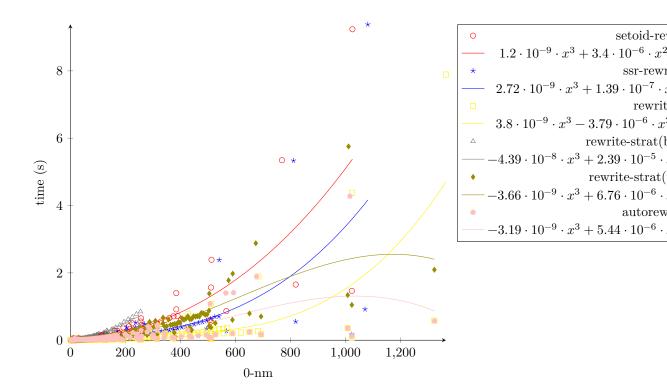
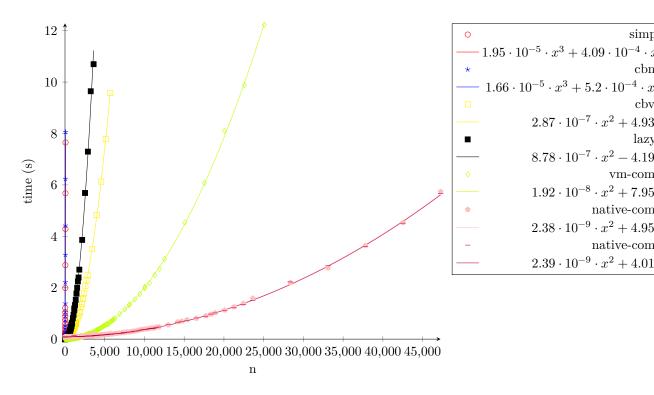


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



simp

vm-com

native-com

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 $2.87 \cdot 10^{-7} \cdot x^2 + 4.93$

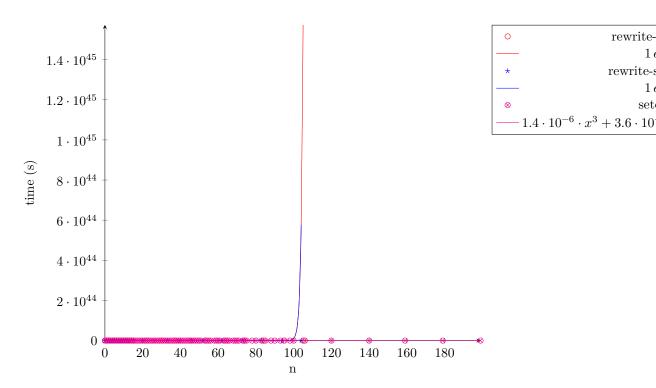
 $8.78 \cdot 10^{-7} \cdot x^2 - 4.19$

 $1.92 \cdot 10^{-8} \cdot x^2 + 7.95$

 $2.38 \cdot 10^{-9} \cdot x^2 + 4.95$

 $2.39 \cdot 10^{-9} \cdot x^2 + 4.01$

Figure 17: timing-sieve-of-eratosthenes



rewrite-

rewrite-s

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

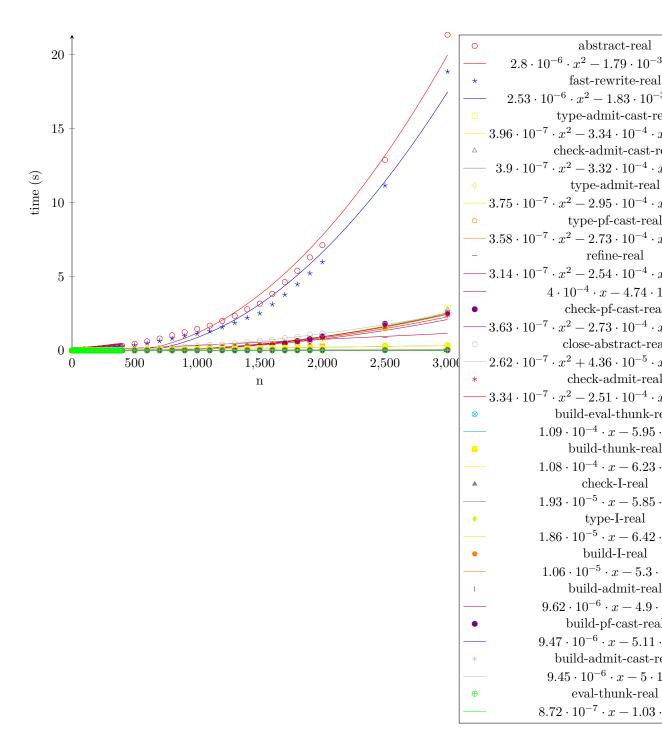


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2