

Figure 1: timing-pattern

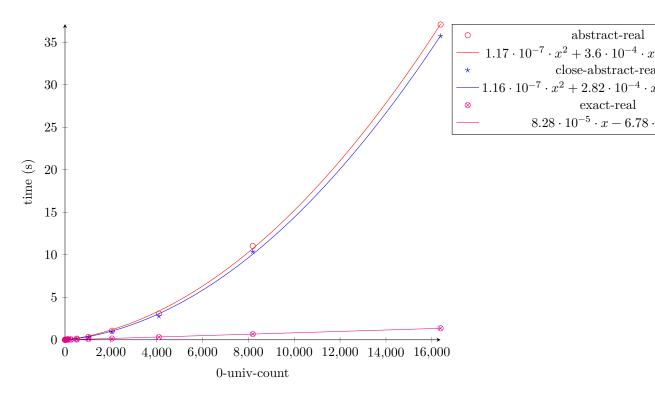
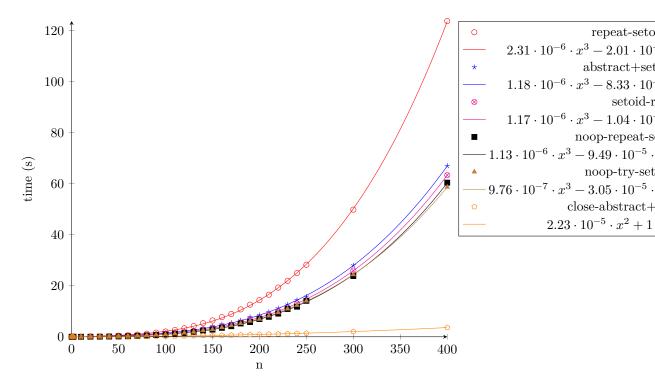


Figure 2: timing-n-polymorphic-universes param-1-n $\,0\,$



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

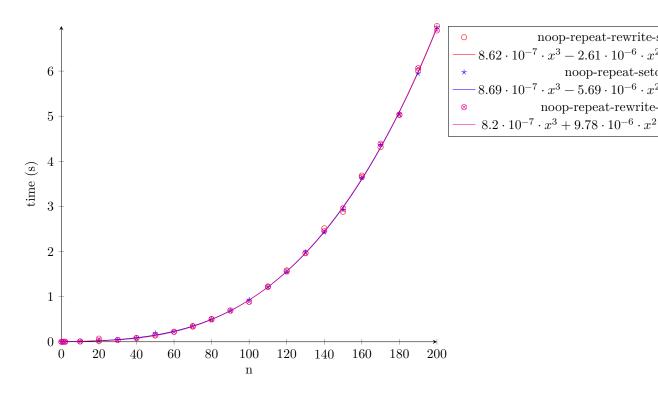
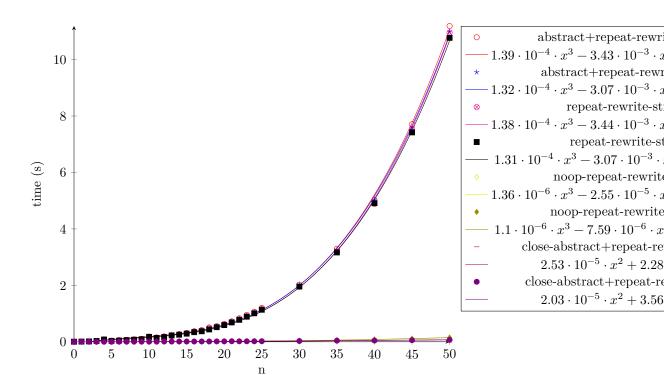
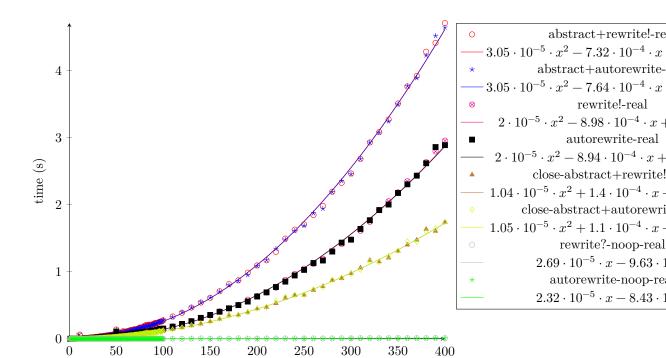


Figure 4: timing-repeat-setoid-rewrite-under-binders-noop



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



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

n

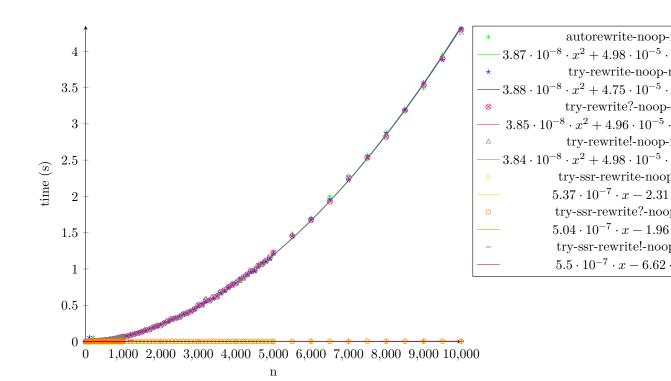


Figure 7: timing-rewrite-repeated-app-autorewrite-noop

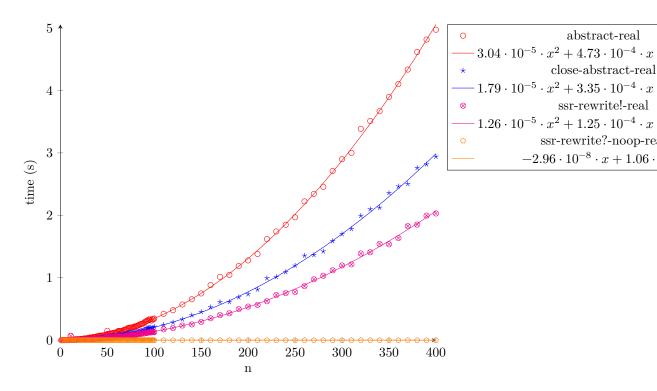


Figure 8: timing-rewrite-repeated-app-ssrrewrite

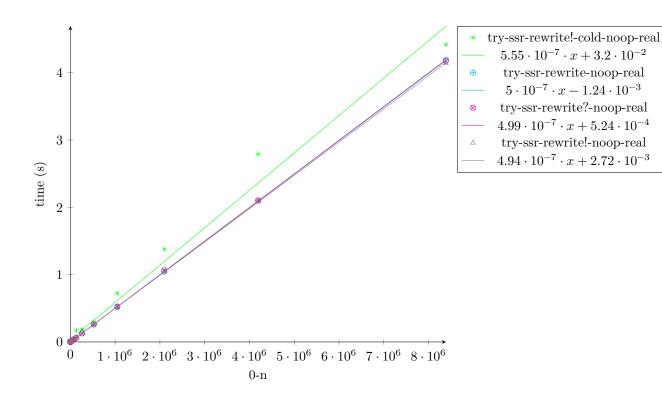
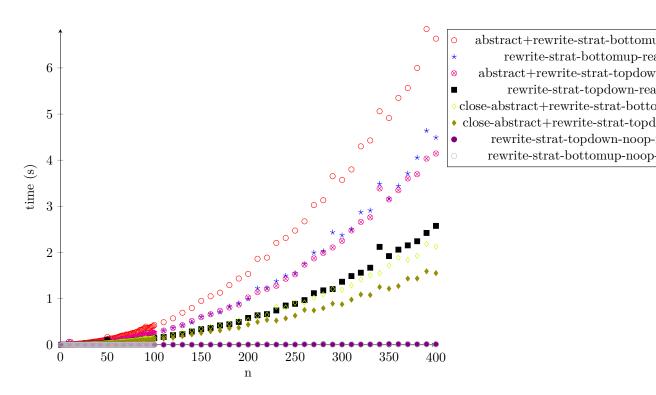


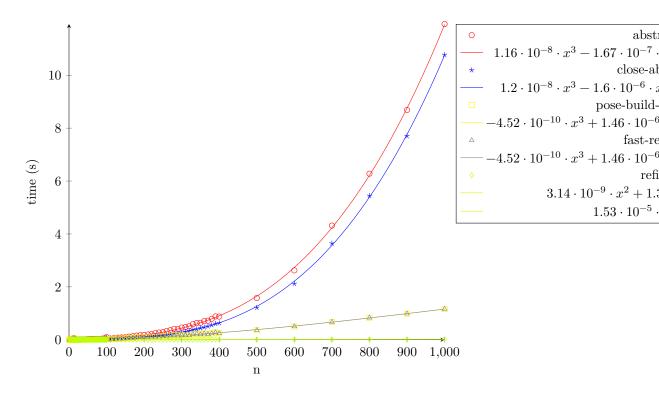
Figure 9: timing-rewrite-repeated-app-ssrrewrite-noop param-1-lgn $\ 1$



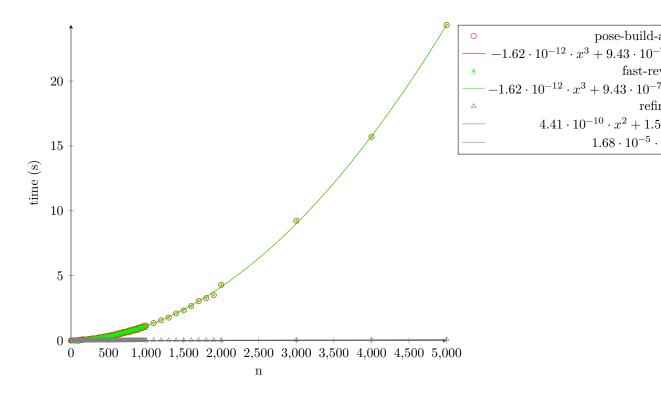
rewrite-strat-bottomup-real

rewrite-strat-topdown-rea

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



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



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

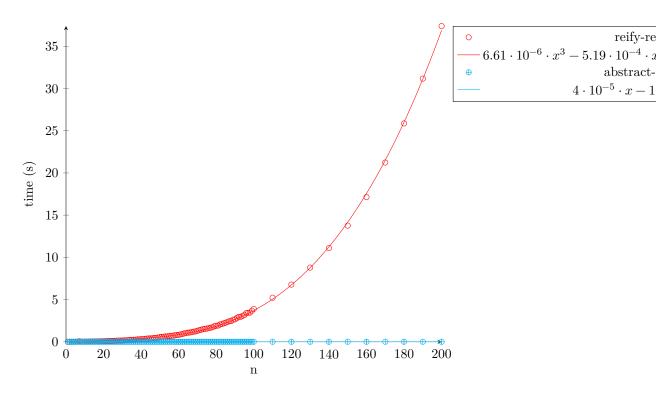


Figure 13: timing-typeclass-reification-let-in-HOAS

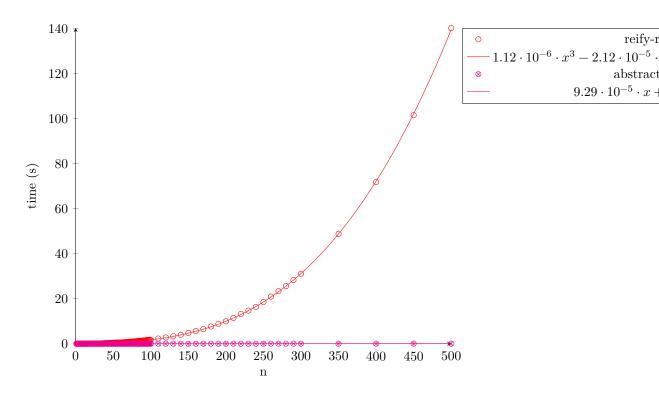


Figure 14: timing-typeclass-reification-let-in-PHOAS

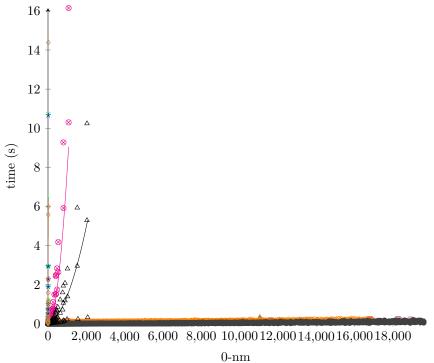


Figure 15: timing-rewrite-lift-lets-map param-1-n 1, param-2-m 1

rewrite-strat (top down-bot $5.79 \cdot 10^{-3} exp (0.47 \cdot ($ rewrite-strat(bottomup-bot $6.91 \cdot 10^{-3} exp (0.46 \cdot ($ cps+cbn-real $7.81 \cdot 10^{-6} \cdot x^2 - 7.44 \cdot 10^{-6} \cdot x^2$ cps+vm-compute- $2.25\cdot 10^{-10}\cdot x^2 + 5.79\cdot 10^{-6}\cdot \\$ cps+native-compute $1.12\cdot 10^{-10}\cdot x^2 + 5.48\cdot 10^{-6}\cdot \\$ $\operatorname{cps+lazy-real}$ $2.67 \cdot 10^{-10} \cdot x^2 + 4.22 \cdot 10^{-6} \cdot$ cps+cbv-real $1.09 \cdot 10^{-10} \cdot x^2 + 3.75 \cdot 10^{-6}$ cps+simpl-real $1.05 \cdot 10^{-6} \cdot x^2 + 4.03 \cdot 10^{-4} \cdot x^2$ setoid-rewrite-re $-8.29 \cdot 10^{-3} \cdot x^3 + 0.27 \cdot x^2 - \\$

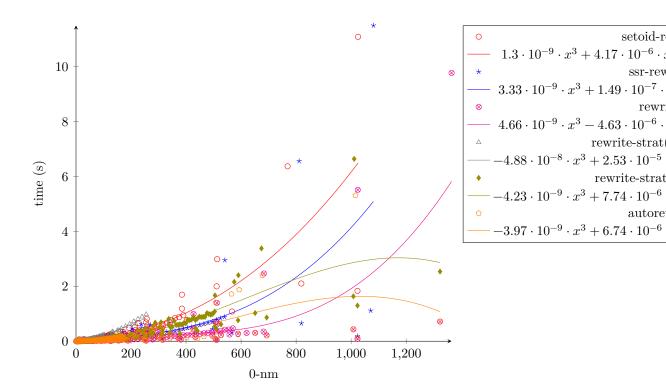
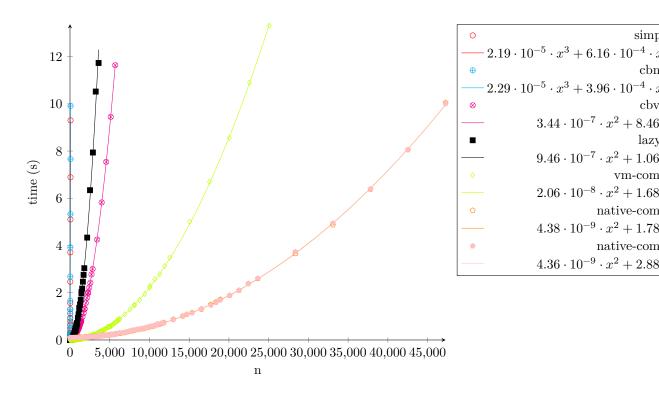


Figure 16: timing-rewrite-plus-0-tree param-1-n 0, param-2-m 1, param-3-input-size 5, param-4-output-size 3, param-5-num-rewrites 1



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 $3.44 \cdot 10^{-7} \cdot x^2 + 8.46$

 $9.46 \cdot 10^{-7} \cdot x^2 + 1.06$

 $2.06 \cdot 10^{-8} \cdot x^2 + 1.68$

 $4.38 \cdot 10^{-9} \cdot x^2 + 1.78$

 $4.36 \cdot 10^{-9} \cdot x^2 + 2.88$

 $Figure\ 17:\ timing\mbox{-sieve-of-eratos} thenes$

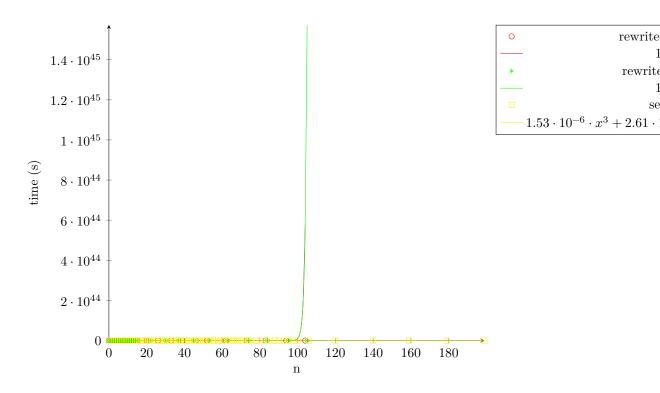


Figure 18: timing-rewrite-under-lets-plus-0 $\,$

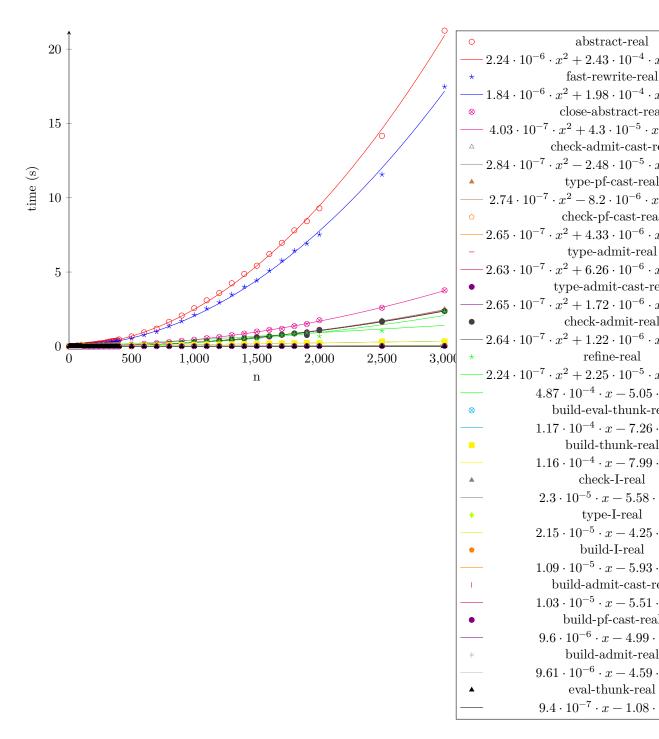


Figure 19: timing-rewrite-repeated-app-fast-rewrite-ltac2