egglog In Practice

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With thanks to the rest of the egglog team!

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Why egglog?

Why egglog?

egg

egglog

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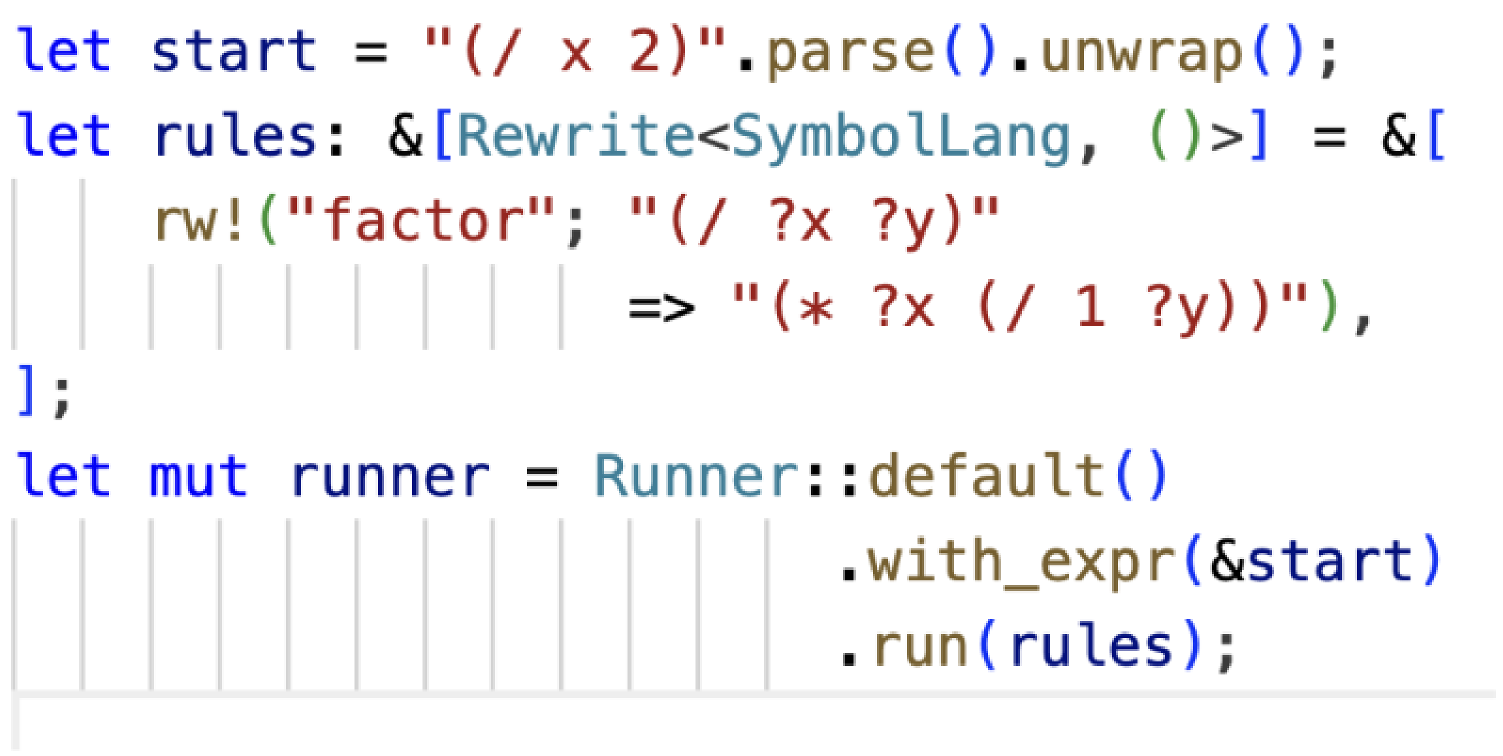
egg	egglog
library	language

Why egglog?

egg

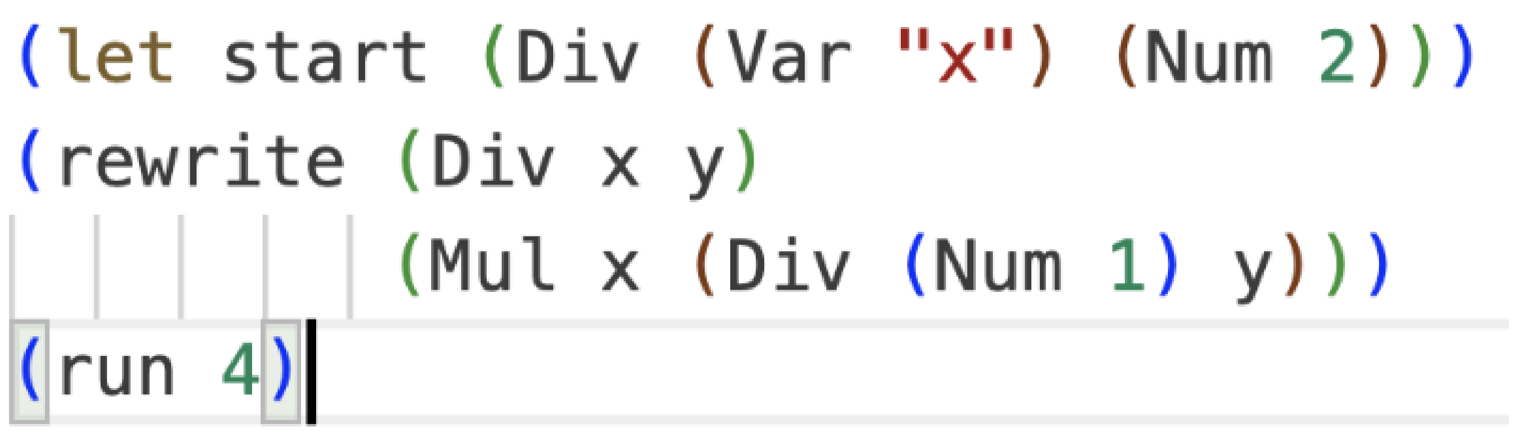
library



```
let start = "(/ x 2)".parse().unwrap();
let rules: &[Rewrite<SymbolLang, ()>] = &[
    rw!("factor"; "(/ ?x ?y)"
              => "(* ?x (/ 1 ?y))"),
];
let mut runner = Runner::default()
                    .with_expr(&start)
                    .run(rules);
```

egglog

language



```
(let start (Div (Var "x") (Num 2)))
(rewrite (Div x y)
         (Mul x (Div (Num 1) y)))
(run 4)
```

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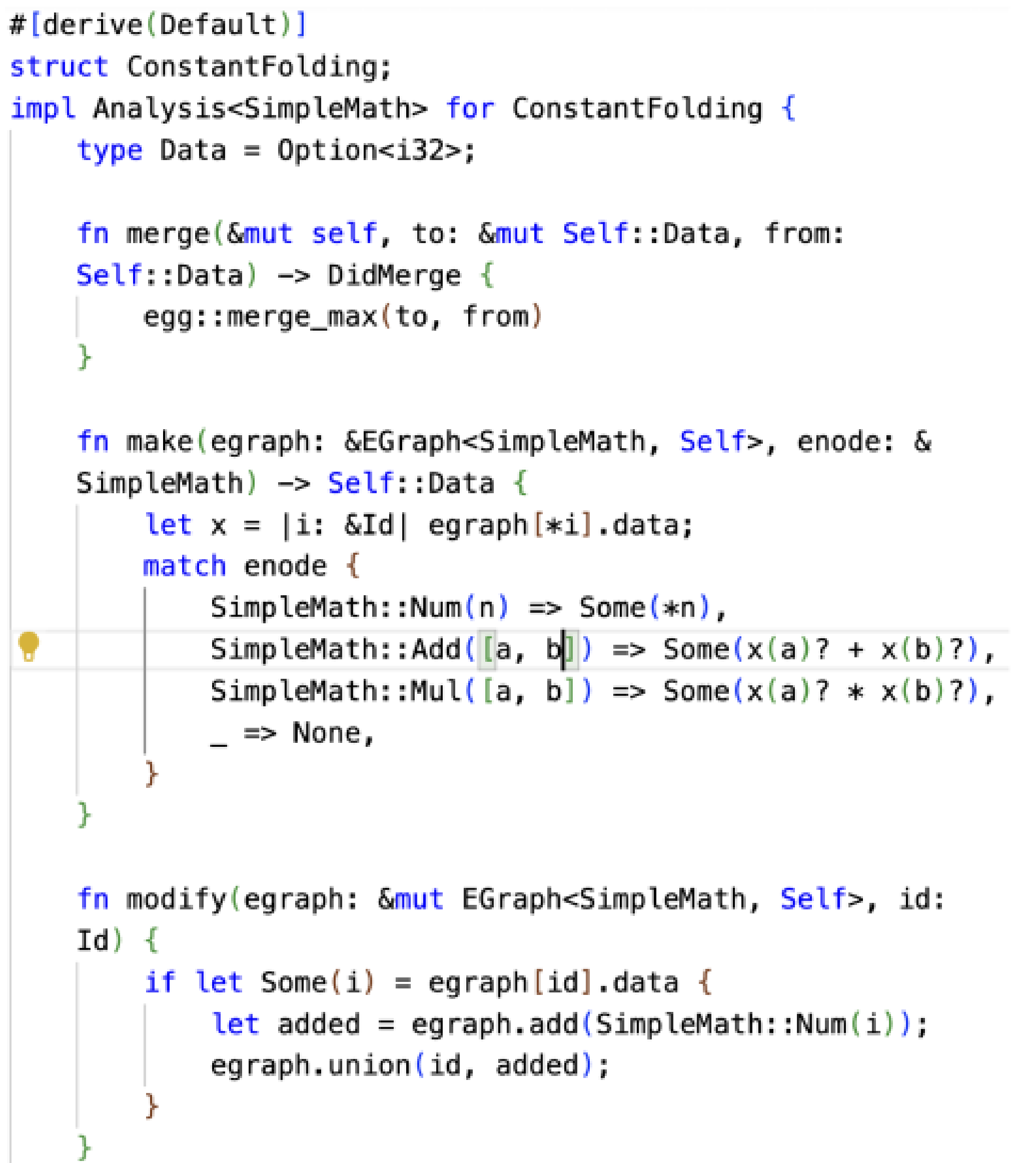
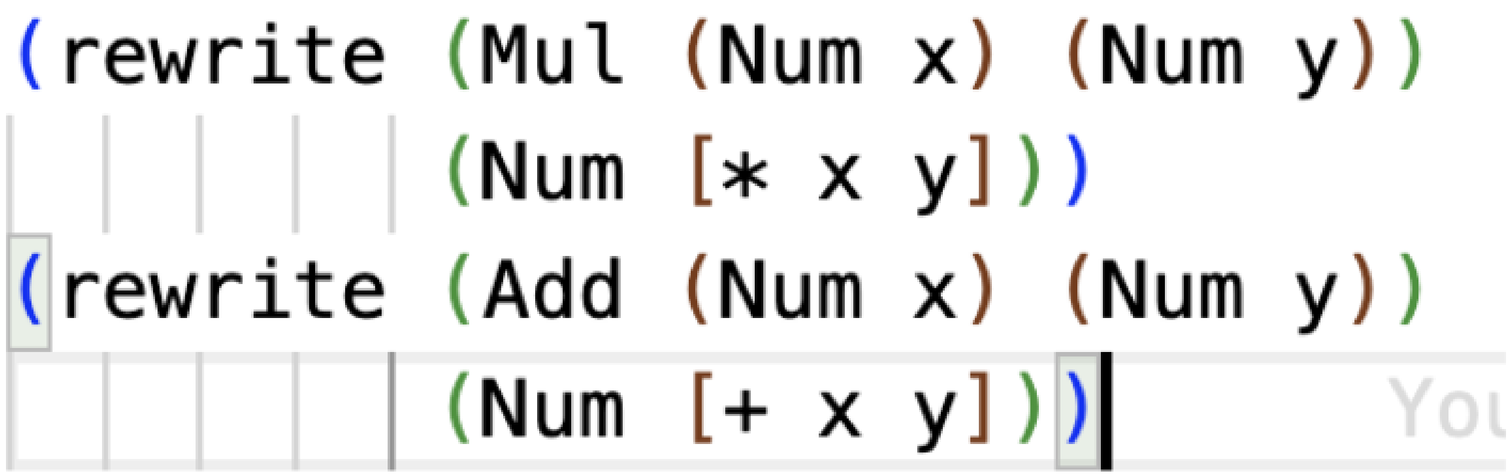


```
#[derive(Default)]
struct ConstantFolding;
impl Analysis<SimpleMath> for ConstantFolding {
    type Data = Option<i32>;

    fn merge(&mut self, to: &mut Self::Data, from:
    Self::Data) -> DidMerge {
        egg::merge_max(to, from)
    }

    fn make(egraph: &EGraph<SimpleMath, Self>, enode: &
    SimpleMath) -> Self::Data {
        let x = |i: &Id| egraph[*i].data;
        match enode {
            SimpleMath::Num(n) => Some(*n),
            SimpleMath::Add([a, b]) => Some(x(a)? + x(b)?),
            SimpleMath::Mul([a, b]) => Some(x(a)? * x(b)?),
            _ => None,
        }
    }

    fn modify(egraph: &mut EGraph<SimpleMath, Self>, id:
    Id) {
        if let Some(i) = egraph[id].data {
            let added = egraph.add(SimpleMath::Num(i));
            egraph.union(id, added);
        }
    }
```



```
(rewrite (Mul (Num x) (Num y))
         (Num [* x y]))
(rewrite (Add (Num x) (Num y))
         (Num [+ x y]))
```

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slow multi-patterns	fast database joins

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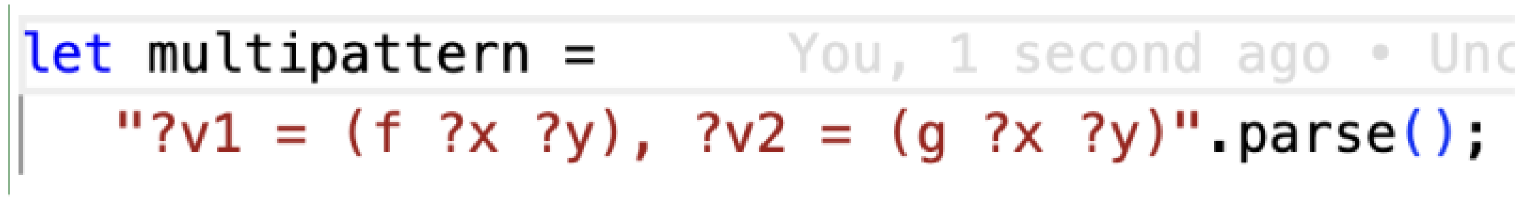
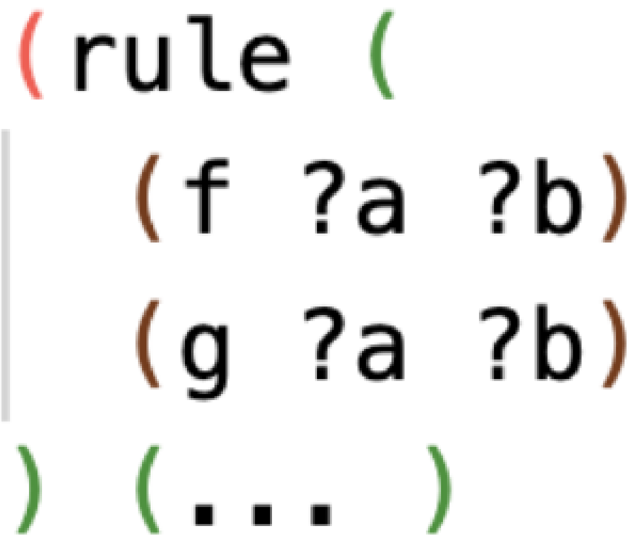


```
let multipattern =        You, 1 second ago • Unc
    "?v1 = (f ?x ?y), ?v2 = (g ?x ?y)".parse();
```



```
(rule (
  (f ?a ?b)
  (g ?a ?b)
) (... )
```

Why egglog?

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e-class analysis	composable analysis
slow multi-patterns	fast database joins
slow e-matching	incremental e-matching

Why egglog?

egg

library

e-class analy

slow multi-pa

slow e-match

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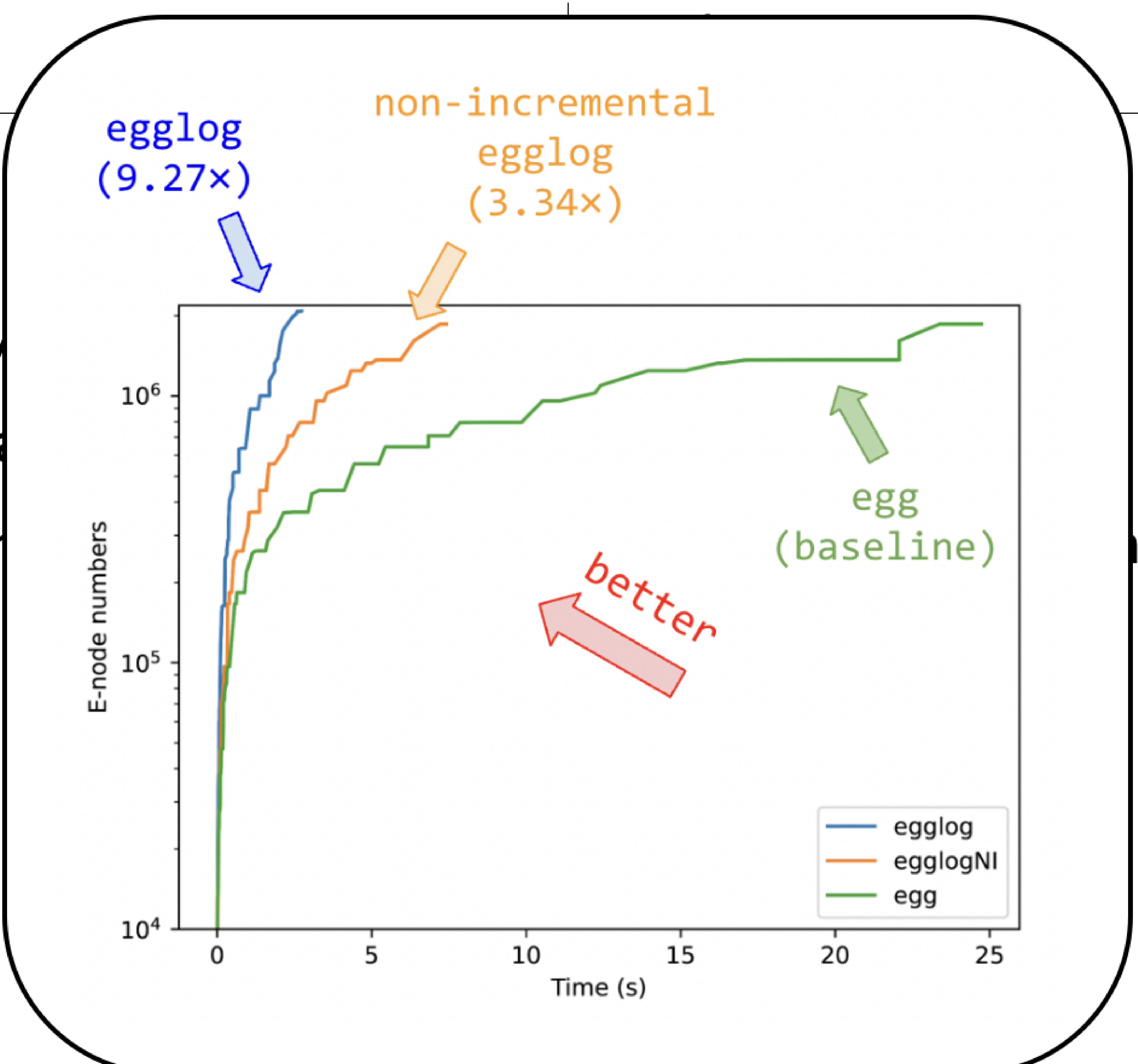

egglog (9.27×)

non-incremental egglog (3.34×)

egg (baseline)

better