Genetic Programming

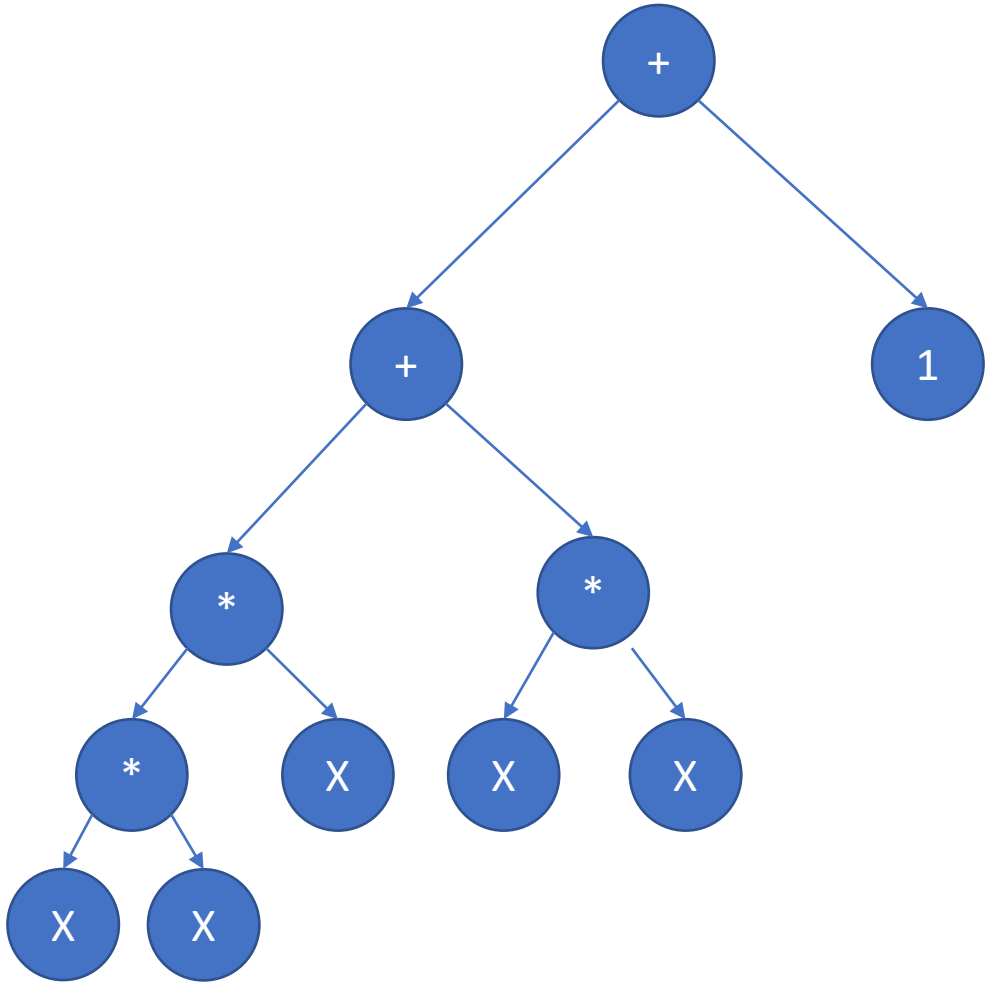
Problem, a simple function:

data = $\mathbf{x}^3 + \mathbf{x}^2 + 1$

Operators : *, + and –

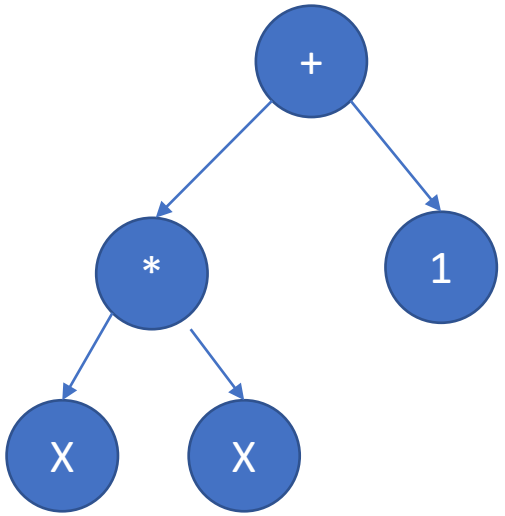
Terminators : -2,-1,0, 1 ,2 and **x**

-1 <= x <= 1

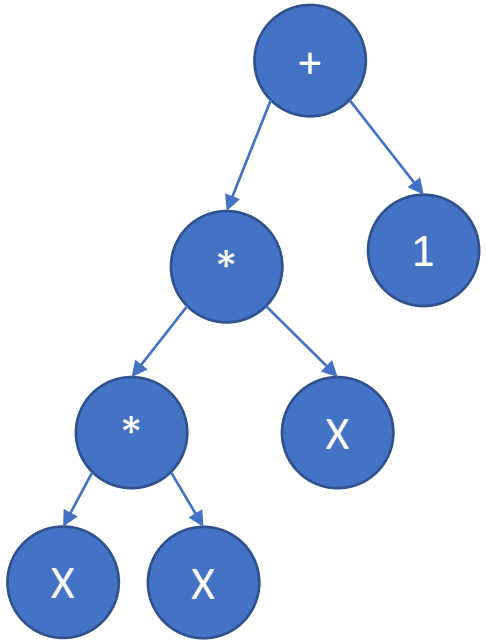


Inspired by https://control.com/technical-articles/genetic-operators-in-evolutionary-algorithms/

Randomly generate a number of solutions and evaluate them



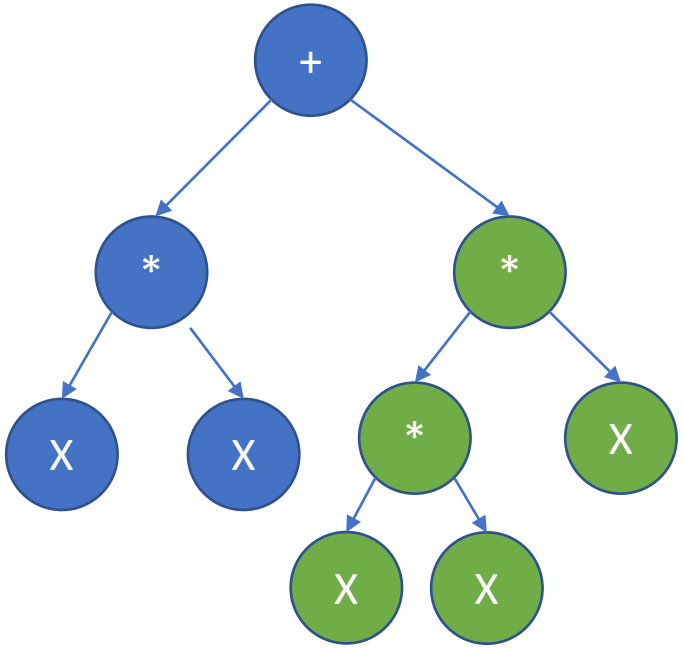
$Y = x^2 + 1$ (15.3)



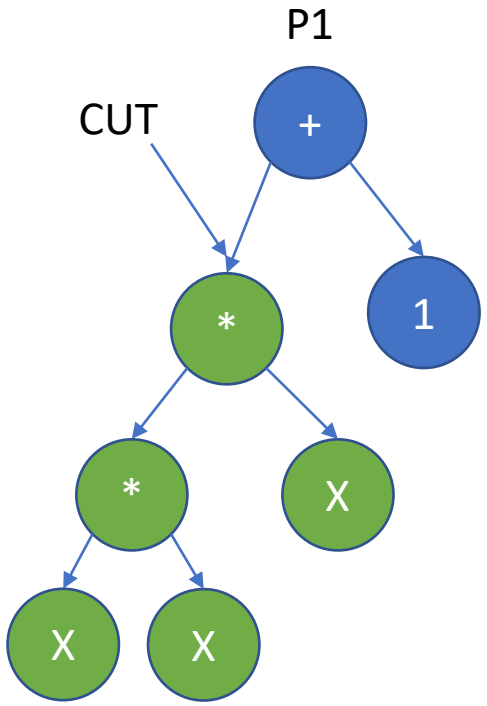
$Y = x^3 + 1$ (21.0)

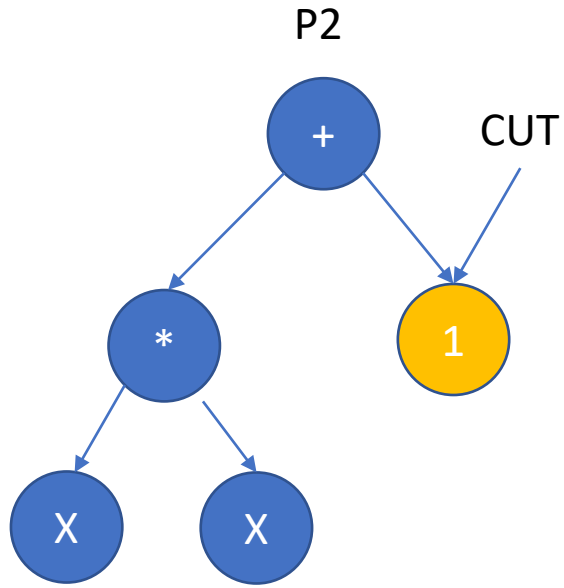
Inspired by https://control.com/technical-articles/genetic-operators-in-evolutionary-algorithms/

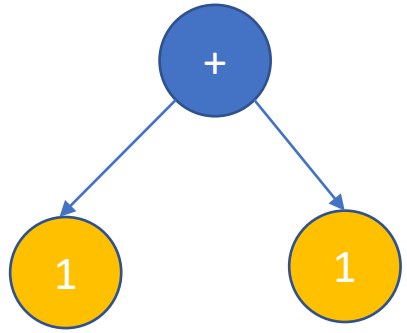
Cross parents to create offspring



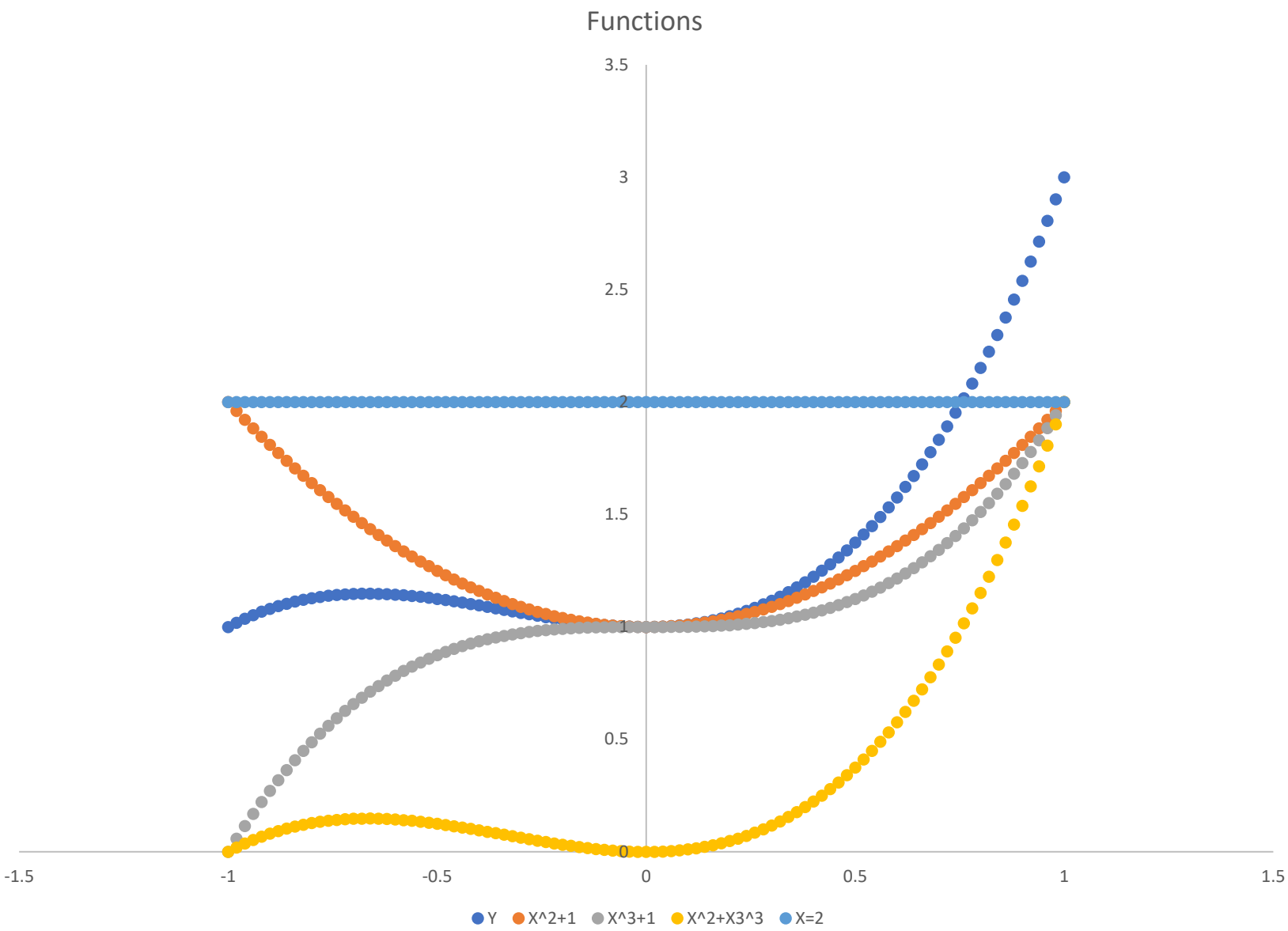
$Y = x^2 + x^3$ (101)



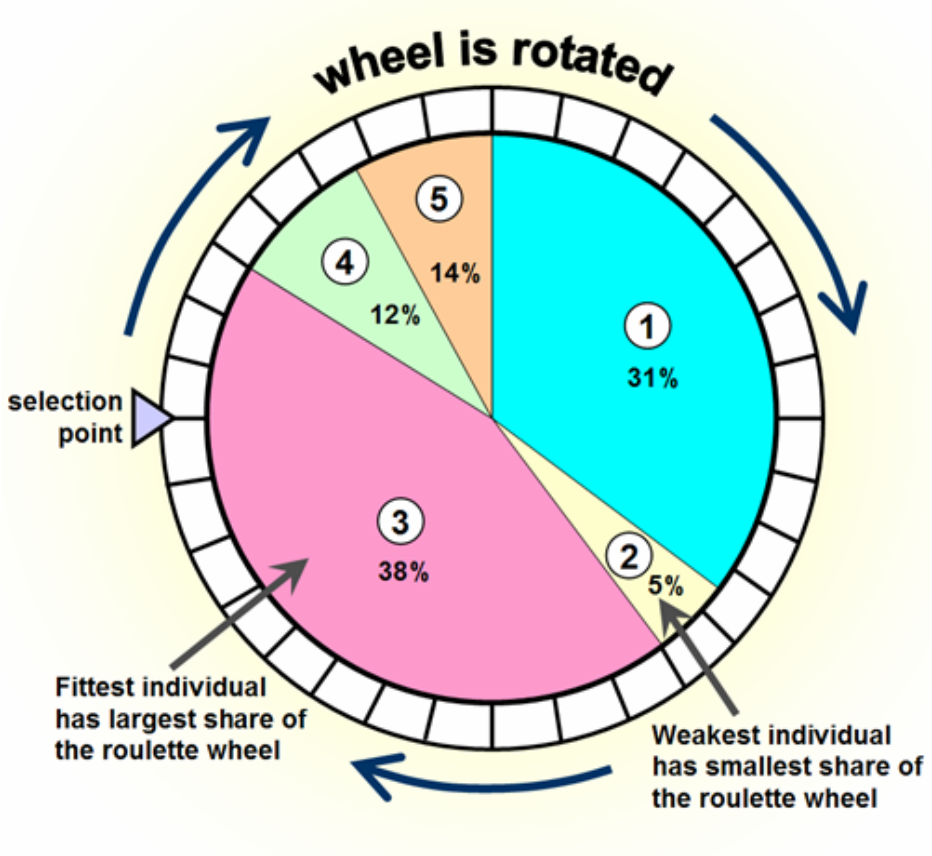


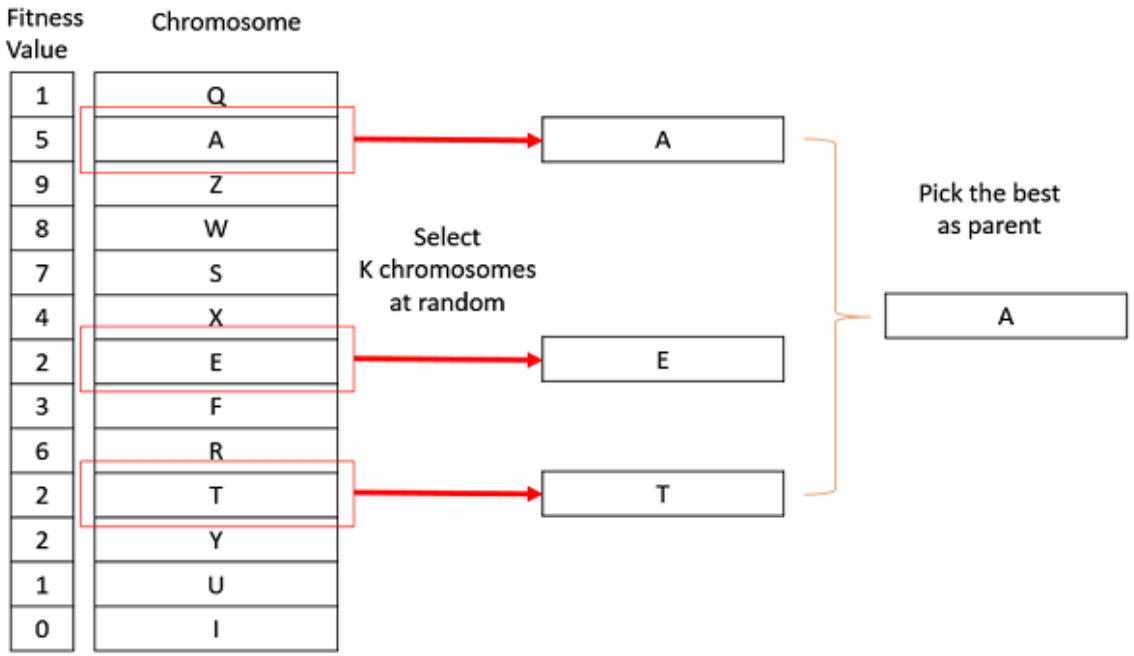


Y = 1+1 (68.6)


Functions
3.5
3
2.5
2
1.5
1
0.5
0
-1.5
-1
-0.5
0
0.5
1
1.5
Y
X^2+1
X^3+1
X^2+X3^3
X=2

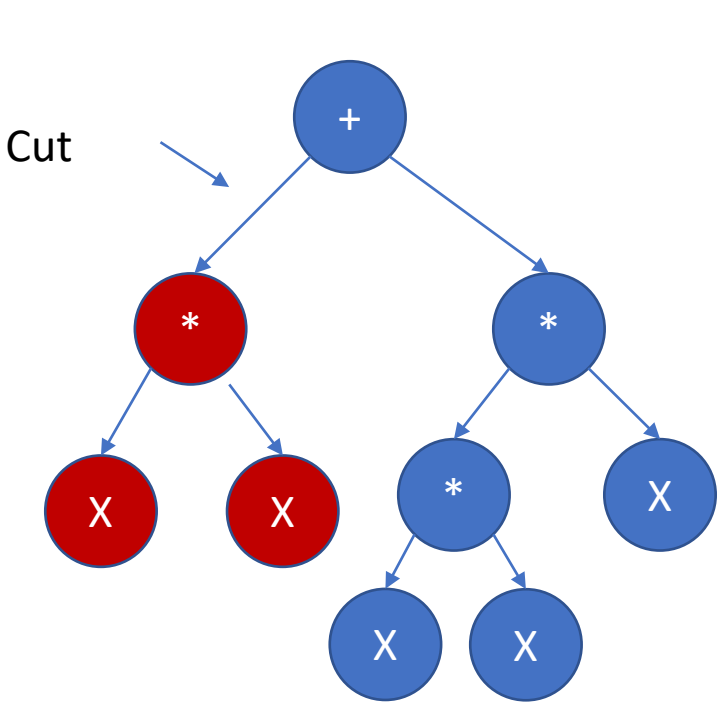
Roulette Wheel and Tournament selection

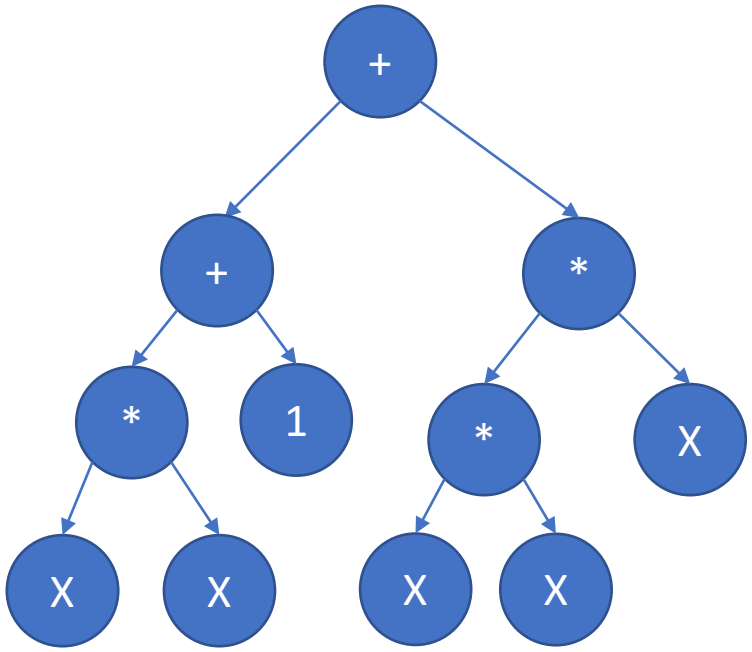




http://www.edc.ncl.ac.uk/highlight/rhjanuary2007g02.php

Mutation





Y = 1 + (X*X) + X * (X*X) -> 0

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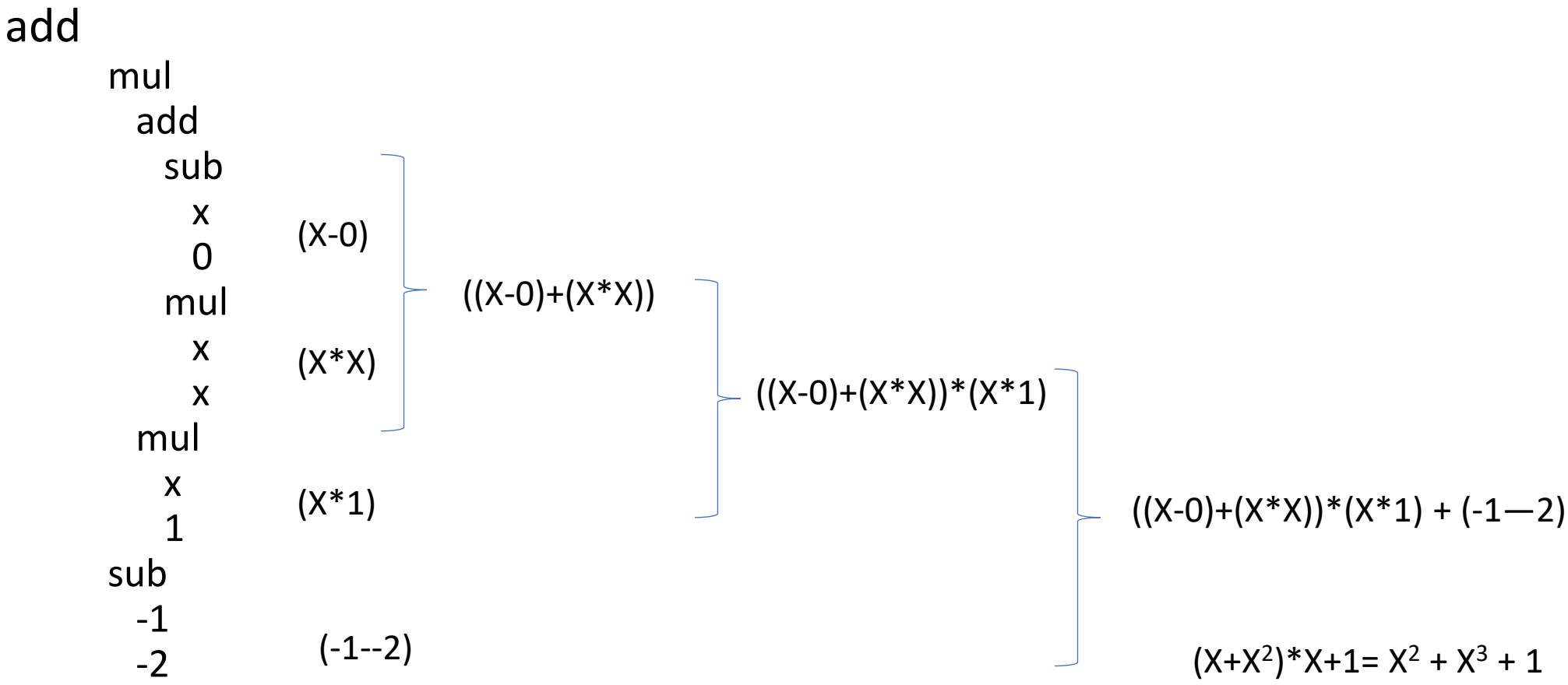
Tiny Genetic Programming in Python



https://github.com/moshesipper/tiny_gp