

airtograd demo

$$6 \quad f = \begin{cases} sx + \alpha, & \text{if } x \geq 0 \\ sx - \alpha, & \text{otherwise} \end{cases}$$

7. $f' = \text{bwfw}(f)$:

$t \leftarrow []$,

$f_w: t: [x], [sx], [\alpha], [sx \pm \alpha]$

$\text{bw}: t.\text{last}.\text{append}(1)$
 $\quad \quad \quad \text{gs.}$

$\forall v \in t, \text{reverse}$

$g \leftarrow \text{sum}(v, \text{gs})$

$\forall (w, \text{op}) \in v.\text{ops}$

$v.\text{gs}.\text{append}(\text{op}(g))$

8. $f'' = \text{bwfw}(f')$:

$t \leftarrow []$

$f_w: t: [x], [sx], [\alpha], [sx \pm \alpha], "", "", [[sx]], \text{ops} = \text{gc}$

$f', t: [[x]], [[sx]], [[\alpha]], [[sx \pm \alpha]], "", "",$

- $s: \text{gc}, c: -\text{gs},$
 $\text{add}: g, g \quad \text{subtract}: g, -g$
 $\text{neg}: -g, \quad \text{add to}: g, g$

(old, new)

 $\text{mul}: \text{gx}_2, \text{gx}_1$
- make \mid differentiable
- $\text{sum}: \text{list} \rightarrow s$
 $s \leftarrow 0.$
 $\forall v \in \text{list} = s += v, \text{ i.e. add to } (s, v)$
- $s[\alpha] \rightarrow [sx],$
 $[sx].\text{ops} = \text{gc}$
- $s[[x]]: \rightarrow [[sx]],$