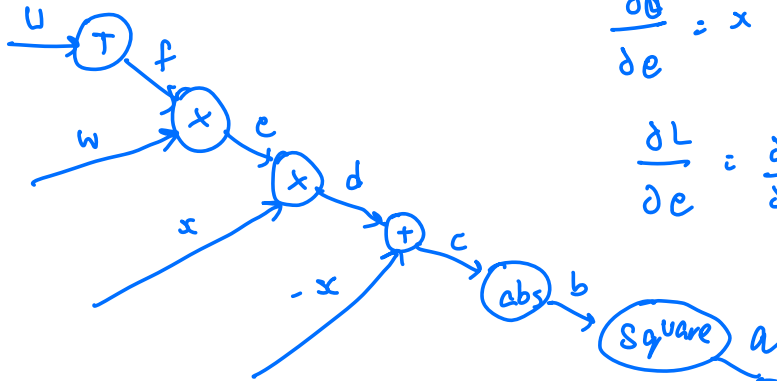L

$d = e \times x$

$\dfrac{\partial d}{\partial e} = x \qquad \dfrac{\partial d}{\partial x} = e$

$\dfrac{\partial L}{\partial e} = \dfrac{\partial L}{\partial d} \times \dfrac{\partial d}{\partial e}$

$= \begin{cases} bx, & c \geq 0 \\ -bx, & c < 0 \end{cases}$

$\dfrac{\partial L}{\partial x} = \begin{cases} -be, & c \geq 0 \\ be, & c < 0 \end{cases}$

(computation graph with nodes: $u \to T \xrightarrow{f} \times \xrightarrow{e} \times \xrightarrow{d} + \xrightarrow{c} abs \xrightarrow{b} Square \xrightarrow{a} \times \to L$, with inputs w, x, $-x$, and $\frac{1}{2}$)

$b = |c| \qquad \dfrac{\partial b}{\partial c} : \begin{cases} +1, & c \geq 0 \\ -1, & c < 0 \end{cases}$

$\dfrac{\partial L}{\partial c} = \dfrac{\partial L}{\partial b} \cdot \dfrac{\partial b}{\partial c}$

$= \begin{cases} b, & c \geq 0 \\ -b, & c < 0 \end{cases}$

$c = d - x$

$\dfrac{\partial c}{\partial d} = 1 \qquad \dfrac{\partial c}{\partial x} = -1$

$\dfrac{\partial L}{\partial d} = \dfrac{\partial L}{\partial c} \cdot \dfrac{\partial c}{\partial d} = \begin{cases} b, & c \geq 0 \\ -b, & c < 0 \end{cases}$

$\dfrac{\partial L}{}$

$L = a/2$

$\dfrac{\partial L}{\partial a} = \frac{1}{2}$

$a = b^2$

$\dfrac{\partial L}{\partial b} = \dfrac{\partial L}{\partial a} \cdot \dfrac{\partial a}{\partial b}$

$= \left(\frac{1}{2}\right) \cdot (2b)$

$= b$

$$\frac{\partial L}{\partial x} = \begin{cases} -b, & c \geq 0 \\ b, & c < 0 \end{cases}$$

$$e = fw$$

$$\frac{\partial L}{\partial f} = \frac{\partial e}{\partial f} \frac{\partial L}{\partial e}$$

$$\frac{\partial L}{\partial f} = \begin{cases} wxb, & c \geq 0 \\ -wxb, & c < 0 \end{cases}$$

$$\frac{\partial L}{\partial w} = \begin{cases} fxb, & c \geq 0 \\ -fxb, & c < 0 \end{cases}$$

$$W^T x K + K^T x^T W^?$$

$$\frac{\partial L}{\partial w} = \begin{cases} (wxb)^T, & c \geq 0 \\ (fwxb)^T, & c < 0 \end{cases}$$