

## UNIVERSITY

y= fix+bo) yne = g(y: w, +b)

 $J = \sum_{i=1}^{n} (y_{pre,i} - y_i)^2$ ,  $f_i(h_i, h_i, h_m)$ 

g: (t, tz, ... tn)

 $0 \frac{\partial J}{\partial b_{i,p}} = \frac{\sum_{i=1}^{n} 2(y_{pre,i} - y_i)}{\sum_{i=1}^{n} 2(y_{pre,i} - y_i)} \cdot \frac{\partial g_i}{\partial b_{i,p}}$   $= \frac{\sum_{i=1}^{n} 2(y_{pre,i} - y_i)}{\sum_{k=1}^{n} 2g_i} \cdot \frac{\partial f_k}{\partial f_{k,p}}$ = = 2 (ypre, i-yi). 29i =2(grep-y). 29 2tp

tk=yow,成中的果然  $\frac{\partial t_k}{\partial b_{1,p}} = \begin{cases} 0 & k \neq p \\ 0 & k \neq p \end{cases}$ 

 $\frac{\partial g}{\partial t_p} = \begin{pmatrix} \frac{\partial dl}{\partial t_p} \\ \frac{\partial g_2}{\partial t_p} \end{pmatrix}$ 

 $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{1}} \right)$   $= 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial b_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{1}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial t_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{\partial t_{2}} \right)$   $= \frac{\partial J}{\partial t_{1}} = 2(y_{pre} - y) \left( \frac{\partial g}{\partial t_{2}} + \frac{\partial g}{$ 

= 214pre-y) = 2+





$$\begin{array}{ll}
\underbrace{\partial J}_{2W_{i},p,q} &= 2 \stackrel{\nearrow}{\succeq} (y_{pre,i} - y_{i}) \stackrel{\partial g_{i}}{= 2W_{i},p,q} \\
&= 2 \stackrel{\nearrow}{\succeq} (y_{pre,i} - y_{i}) \stackrel{\nearrow}{=} \frac{\partial g_{i}}{\partial t_{k}} \stackrel{\partial t_{k}}{= 2W_{i},p,q} \\
&= 2 \stackrel{\nearrow}{=} (y_{pre,i} - y_{i}) \stackrel{\nearrow}{=} \frac{\partial g_{i}}{\partial t_{k}} \stackrel{\partial t_{k}}{= 2W_{i},p,q}
\end{array}$$

$$=2\frac{2}{12}(y_{pre,i}-y_i)\cdot\frac{n}{k-1}\frac{\partial g_i}{\partial t_k}\cdot\frac{m}{k-1}\frac{y_{0,8}}{\partial u_{i,R,q}}\cdot\frac{\partial u_{i,R,k}}{\partial u_{i,R,q}}$$

$$= 2 (y_{pre} - y) \cdot \begin{pmatrix} \frac{\partial g_1}{\partial tq} & y_{0,p} \\ \frac{\partial g_2}{\partial tq} & y_{0,p} \\ \frac{\partial g_3}{\partial tq} & y_{0,p} \end{pmatrix}$$

$$t_{k} = y_{k} \cdot w_{1,k} + b_{1,k}$$

$$\frac{\partial t_{k}}{\partial w_{1}, p_{2}} = \frac{\partial \partial (y_{k} \cdot w_{1,k} + b_{1,k})}{\partial w_{1}, p_{2}}$$

$$= \frac{\partial y_{k}}{\partial w_{1}, p_{2}}$$

$$= \frac{\partial y_{k}}{\partial w_{1}, p_{2}}$$

$$= \frac{\partial w_{1,k}}{\partial w_{1}, p_{2}}$$

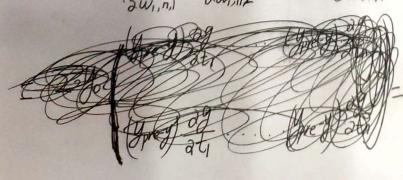
$$= \frac{\partial w_{1,k}}{\partial w_{1,k}}$$

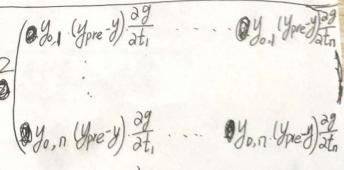
$$= \frac{\partial w_{1,k}}{\partial w_{1,k}}$$

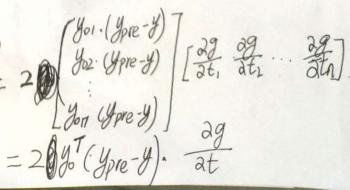
$$= \frac{\partial w_{1,k}}{\partial w_{1,k}}$$

$$\frac{\partial W_{1}, \mathcal{E}_{k}}{\partial W_{1}, \mathcal{P}_{1}\mathcal{Q}} = \begin{cases} 1, & \text{Z-PI}_{k}=2\\ 0, & \text{ZZ} \end{cases}$$

$$\frac{\partial J}{\partial w_{1}} = \begin{pmatrix} \frac{\partial J}{\partial w_{1}, 1, 1} & \frac{\partial J}{\partial w_{1}, 1, 2} & \frac{\partial J}{\partial w_{1}, 1, 2} \\ \vdots & \vdots & \vdots \\ \frac{\partial J}{\partial w_{1}, 1, 1} & \frac{\partial J}{\partial w_{1}, 1, 2} & \frac{\partial J}{\partial w_{1}, 1, 2} \end{pmatrix}$$









# 汕頭大

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WINT

## CHANTON UNIVERSITY

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$$\frac{\partial J}{\partial b_{0},p} = \sum_{i=1}^{n} 2 (y_{pre,i} - y_{i}) \cdot \frac{\partial g_{i}}{\partial b_{0},p}$$

$$= \sum_{i=1}^{n} 2 (y_{pre,i} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot \frac{\partial t_{k}}{\partial b_{0},p} \cdot W_{i,k}$$

$$= 2 \sum_{i=1}^{n} (y_{pre,i} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial b_{0},p} \cdot W_{i,r,k}$$

$$= 2 \sum_{i=1}^{n} (y_{pre,i} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial h_{p}} \cdot W_{i,r,k}$$

$$= 2 \sum_{i=1}^{n} (y_{pre,i} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot W_{i,k} \cdot \frac{\partial f_{i}}{\partial h_{p}}$$

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$$= 2 (y_{pre} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot W_{i,k} \cdot \frac{\partial g_{i}}{\partial h_{p}}$$

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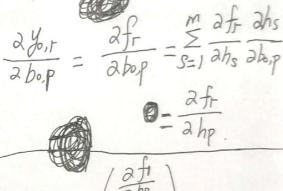
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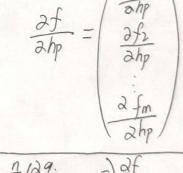
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$$= 2 (y_{pre} - y_{i}) \cdot \sum_{k=1}^{n} \frac{\partial g_{i}}{\partial t_{k}} \cdot W_{i,k} \cdot \frac{\partial g_{i}}{\partial h_{p}} \cdot W_{i,k}$$

 $t_k = y_0 \cdot W_{1,k} + b_{1,k}$   $f_r(h_1, h_2, \dots h_m)$   $h_s = \chi_s + b_{0,s} \Rightarrow \frac{\partial}{\partial b_0 p} = \begin{cases} 1 & s \neq 0 \\ 0 & s \neq 0 \end{cases}$ 





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## 沙頭大學

## SHANTOU UNIVERSITY

$$\frac{\partial f_{\text{tax}} \circ = g}{\partial f} = \frac{\partial g}{\partial t} \frac{\partial g}{\partial t$$

# f = tanh

$$\frac{2f}{ah} = \begin{pmatrix} \frac{\partial f_1}{\partial h_1} & \frac{\partial f_1}{\partial h_2} & \frac{\partial f_1}{\partial h_1} \\ \frac{\partial f_2}{\partial h_1} & \frac{\partial f_2}{\partial h_2} & \frac{\partial f_2}{\partial h_1} \\ \vdots & \vdots & \vdots \\ \frac{\partial f_n}{\partial h_1} & \frac{\partial f_n}{\partial h_2} & \frac{\partial f_n}{\partial h_n} \end{pmatrix}$$

$$= \frac{\sqrt{\frac{2f_1}{ah_1}}}{\frac{2f_2}{ah_2}}$$

$$= \begin{pmatrix} 1-f_1^2 \\ 1-f_2^2 \\ \vdots \\ 1-f_n \end{pmatrix}$$

 $f_i(h_i, h_2, \dots, h_m)$   $tanhx = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}}$ 

$$f_1 = tanh(h_1)$$
  
 $f_2 = tanh(h_2)$ 

$$\frac{\left(\frac{x}{2} + e^{x}\right)^{2} - \left(e^{x} - e^{x}\right)^{2}}{\left(e^{x} + e^{x}\right)^{2}}$$

$$= \left(-\left(\frac{t}{2} + e^{x}\right)^{2}\right)^{2}$$