RBF

$$F_K = Z_i = \sum_j \left[(X_j - W_{ij})^2\right]$$

$$= \begin{bmatrix} (x_1 - w_{11})^2 + (x_2 - w_{12})^2 + (x_3 - w_{13})^3 + \dots \\ (x_1 - w_{21})^2 + (x_2 - w_{22})^2 + \dots \\ \vdots \end{bmatrix}$$

$$\frac{\delta f_K}{\delta X_{K-1}} = \begin{bmatrix} 2(x_1 - w_{11}) & 2(x_2 - w_{12}) & \dots \\ 2(x_1 - w_{21}) & 2(x_2 - w_{22}) & \dots \\ \vdots & & \end{bmatrix}$$

$$\frac{\delta E}{\delta X_{K-1}} = \underbrace{\frac{\delta E}{\delta X_K}}_{[P_1,\ P_2,\ \dots]} \times \frac{\delta F_K}{\delta X_{K-1}}$$

$$\frac{\cancel{\delta f_K}}{\cancel{\delta X}} \frac{\delta E}{\delta X_{K-1}} = [P_1, P_2, \dots] \begin{bmatrix} 2(x_1 - w_{11}) & 2(x_2 - w_{12}) & \dots \\ 2(x_1 - w_{21}) & 2(x_2 - w_{22}) & \dots \end{bmatrix}$$

$$\frac{\delta E}{\delta X_{K-1}} = \begin{bmatrix} 2P_1(x_1 - w_{11}) + 2P_2(x_1 - w_{21}) + \dots \\ 2P_1(x_2 - w_{12}) + 2P_2(x_2 - w_{22}) + \dots \\ \dots \end{bmatrix}$$

$$\frac{\delta E}{\delta w_k} = \frac{\delta E}{\delta x_k} \times \frac{\delta f_k}{\delta W}$$

Now
$$\frac{\delta f_k}{\delta w_k} = \begin{bmatrix} \begin{bmatrix} -2(x_1 - w_{11}) & -2(x_2 - w_{12}) \\ \vdots & \vdots \end{bmatrix} \\ \begin{bmatrix} -2(x_1 - w_{21}) & -2(x_2 - w_{22}) \\ \vdots & \vdots \end{bmatrix} \\ \vdots \end{bmatrix}$$

So
$$\frac{\delta E}{\delta w_k} = \frac{\delta E}{\delta x_k} \times \checkmark$$

$$= [p_1, p_2, \ldots] \times \begin{bmatrix} \quad \end{bmatrix}$$

$$= \begin{bmatrix} -2p_1(x_1 - w_{11}) & -2p_1(x_2 - w_{12}) & \cdots \\ -2p_2(x_1 - w_{21}) & -2p_2(x_2 - w_{22}) & \cdots \\ \vdots & & \end{bmatrix}$$

MUL POST

$$\frac{\delta F_K}{\delta X_{K-1}} \qquad F_K = \begin{bmatrix} x_1 e^w \\ x_2 e^w \\ \vdots \end{bmatrix}$$

$$\frac{\delta F_K}{\delta X_{K-1}} = \begin{bmatrix} e^w & 0 & 0 & 0 & \cdots & 0 \\ 0 & e^w & 0 & 0 & \cdots & 0 \\ 0 & 0 & e^w & 0 & \cdots & 0 \\ 0 & 0 & 0 & 0 & \cdots & e^w \end{bmatrix}$$

$$\frac{\delta \mathcal{E}}{\delta X_{K-1}} = \begin{bmatrix} P_1 & P_2 & \cdots \end{bmatrix} \begin{bmatrix} \quad \end{bmatrix}$$

$$= \begin{bmatrix} P_1 e^w \\ P_2 e^w \\ \vdots \end{bmatrix}$$

$$\frac{\delta \mathcal{E}}{\delta W_K} = \frac{\delta \mathcal{E}}{\delta X_K} \times \frac{\delta F_K}{\delta W}$$

$$\frac{\delta F_K}{\delta W} = \begin{bmatrix} x_1 e^w \\ x_2 e^w \\ \vdots \end{bmatrix} \ \& \ \frac{\delta \mathcal{E}}{\delta X_K} = \begin{bmatrix} P_1 & P_2 & \cdots \end{bmatrix}$$

$$\frac{\delta \mathcal{E}}{\delta W_K} = \begin{bmatrix} P_1 X_1 e^w + P_2 X_2 e^w + P_3 X_3 e^w + \cdots \end{bmatrix}$$

Neg Exp

$$F_K = \begin{bmatrix} e^{-x_1} \\ e^{-x_2} \\ e^{-x_3} \\ \vdots \end{bmatrix} \quad \frac{\delta F_K}{\delta X_{K-1}} = \begin{bmatrix} -e^{-x_1} & 0 & \cdots & 0 & \cdots & 0 & \cdots & 0 \\ 0 & -e^{-x_2} & \cdots & 0 & \cdots & 0 & \cdots & 0 \\ \vdots & & & & & & & \\ 0 & 0 & \cdots & 0 & \cdots & & & -e^{-x_n} \end{bmatrix}$$

$$\frac{\delta E}{\delta X_{K-1}} = \begin{bmatrix} P_1 & P_2 & \cdots \end{bmatrix} \begin{bmatrix} & & \\ & & \end{bmatrix}$$

$$= \begin{bmatrix} -P_1 e^{-x_1} \\ -P_2 e^{-x_2} \\ \vdots \end{bmatrix}$$

$$\frac{\delta E}{\delta W_K} = \begin{bmatrix} P_1 & P_2 & \cdots & P_K \end{bmatrix} \times 0$$

$$= 0$$