

逆に  $f(x) = Ax + w$ ,  $f(y) = Ay + w$   $A = (a_{ij})$

$|x - y| \stackrel{(?)}{=} |f(x) - f(y)|$  を示す。↓

$$\downarrow \quad \parallel \quad \parallel$$

$$\sum_{i=1}^3 (x_i - y_i)^2 \quad \sum_{i=1}^3 \left( \sum_{j=1}^3 a_{ji} (x_j - y_j) \right)^2$$

$$\downarrow \quad \parallel \quad \parallel \quad \downarrow$$

$$\sum_{j=1}^3 \sum_{k=1}^3 \delta_{jk} (x_j - y_j)(x_k - y_k) \quad \sum_{i=1}^3 \sum_{j=1}^3 a_{ij} (x_j - y_j) \sum_{k=1}^3 a_{ik} (x_k - y_k)$$

$$\parallel \quad \downarrow$$

$$\sum_{i=1}^3 \sum_{j=1}^3 \sum_{k=1}^3 a_{ij} a_{ik} (x_j - y_j)(x_k - y_k)$$

$$\parallel$$

$$\sum_{j=1}^3 \sum_{k=1}^3 \underbrace{\sum_{i=1}^3 a_{ij} a_{ik}}_{\delta_{jk}} (x_j - y_j)(x_k - y_k)$$

$\delta_{jk} \quad (\because A \in O(3))$

□