$$x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}_{2\times 1} \qquad x^T = [x_1 \; x_2]_{1\times 2}$$

$$\underset{n\times m}{A}\,\underset{m\times p}{B} = \underset{n\times p}{C}$$

$$xx^T = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} [x_1, x_2] = \begin{bmatrix} x_1^2 & x_1x_2 \\ x_2x_1 & x_2^2 \end{bmatrix}$$

$$x^T y = y^T x$$

$$\sum_{i=1}^{n} (y_i - w^T\phi_i)^2$$

$$= \sum [y_i^2 - 2y_i(w^T\phi_i) + (w^T\phi_i)^2]$$

$$= \sum y_i^2 - 2w^T \sum y_i\phi_i + \sum w^T\phi_i\phi_i^T w$$

$$w^T \underbrace{\sum(\phi_i\phi_i^T)}_{} w$$