

$$t^T t - t^T X w - w^T X^T t + w^T X^T X w$$

$$0 - (t^T X)^T - X^T t + (X^T X w) + (w^T X^T X)^T$$

$$-tX^T - tX^T + wXX^T + wXX^T$$

$$-2tX^T + 2wXX^T = 0$$

$$wXX^T = tX^T$$

$$w = \frac{tX^T}{XX^T} = (XX^T)^{-1} tX^T$$