$$L = \frac{1}{N}(\underline{t} - \underline{X}\underline{w})^T(\underline{t} - \underline{X}\underline{w})$$

$$= \frac{1}{N}\underline{t}^T\underline{t} - \frac{2}{N}\underline{w}^T\underline{X}^T\underline{t} + \frac{1}{N}\underline{w}^T\underline{X}^T\underline{X}\underline{w}$$

$\frac{\partial}{\partial \underline{w}}$ (see defs in slides)

$$= -\frac{2}{N}\underline{X}^T\underline{t} + \frac{2}{N}\underline{X}^T\underline{X}\underline{w} = 0$$

$$\underline{X}^T\underline{X}\,\underline{w} = \underline{X}^T\underline{t}$$

$$\underline{w} = (\underline{X}^T\underline{X})^{-1}\underline{X}^T\underline{t}$$