

$$l(\mathfrak{D}, \hat{\mathbf{w}}) = -\frac{1}{2m\sigma^2} (\mathbf{y} - \mathbf{X}\mathbf{w})^\top (\mathbf{y} - \mathbf{X}\mathbf{w}) - \frac{1}{2} \ln \sigma^2 - \frac{1}{2} \ln 2\pi, \quad (1)$$

$$\hat{\mathbf{w}} = \left(\frac{1}{2\sigma^2} \mathbf{X}^\top \mathbf{X} \right)^{-1} \frac{1}{2\sigma^2} \mathbf{X}^\top \mathbf{y}, \quad (2)$$

(1) и (2) получаем:

$$l(\mathfrak{D}, \hat{\mathbf{w}}) = -\frac{1}{2m\sigma^2} \mathbf{y}^\top \left(\mathbf{I} - \mathbf{X} \left(\mathbf{X}^\top \mathbf{X} \right)^{-1} \mathbf{X}^\top \right) \left(\mathbf{I} - \mathbf{X} \left(\mathbf{X}^\top \mathbf{X} \right)^{-1} \mathbf{X}^\top \right) \mathbf{y} - \frac{1}{2} \ln \sigma^2 - \frac{1}{2} \ln 2\pi, \quad (3)$$

$$l(\mathfrak{D}, \hat{\mathbf{w}}) = -\frac{1}{2m^2\sigma^2} \mathbf{y}^\top \left(m\mathbf{I} - \mathbf{X}\mathbf{H}_0\mathbf{X}^\top \right) \mathbf{y} - \frac{1}{2} \ln \sigma^2 - \frac{1}{2} \ln 2\pi, \quad (4)$$