

BRUNO BORGES DE SOUZA

LISTA 5

Exercício 21.5

• A ideia é simplesmente encontrar σ^2 na equação $\frac{\partial L}{\partial \sigma^2} = 0$:

$$L(\sigma^2) = -\frac{N}{2} \left(D \log(2\pi) + \sum_{i=1}^H \log \lambda_i + \frac{1}{\sigma^2} \sum_{i=H+1}^D \lambda_i + (D-H) \log \sigma^2 + H \right)$$

$$\frac{\partial L(\sigma^2)}{\partial \sigma^2} = -\frac{N}{2} \left(-\frac{1}{(\sigma^2)^2} \sum_{i=H+1}^D \lambda_i + \frac{D-H}{\sigma^2} \right) = 0$$

$$\Rightarrow -\frac{1}{\sigma^4} \sum_{i=H+1}^D \lambda_i + \frac{D-H}{\sigma^2} = 0$$

$$-\frac{1}{\sigma^2} \sum_{i=H+1}^D \lambda_i + D-H = 0$$

$$\frac{1}{\sigma^2} \sum_{i=H+1}^D \lambda_i = D-H \Leftrightarrow \sigma^2 = \frac{1}{D-H} \sum_{i=H+1}^D \lambda_i$$