Machine Learning

Quiz 4

Student Name: _____

Consider the linear regression model $t = w_0 + \mathbf{w}^T \mathbf{x} + \varepsilon$, where $\mathbf{x} \in \mathbb{R}^D$ and ε is Gaussian noise with zero-mean and known covariance $\sigma^2 I$. We are given N samples $\mathbf{X} = \begin{bmatrix} \mathbf{x}_1 & \dots & \mathbf{x}_N \end{bmatrix}^\top$ with corresponding target variable $\mathbf{t} = \begin{bmatrix} t_1 & \dots & t_N \end{bmatrix}^\top$.

1. (1 point) What and how many parameters are to be learned from the data? How many degrees of freedom?

2. (1 point) State the maximum likelihood estimation problem for the parameters. (abstractly)

3. (2 points) Take the negative logarithm, then state the corresponding error function/loss minimization. (specific)