Machine Learning 1 – Exercise 3

Machine Learning for Computer Vision
TU Dresden

Deciding with linear functions: Logistic regression

a) In the lecture notes[1], derive (3.42) from (3.40) using (3.41), (3.35) and (3.36)

b) Prove that the objective function φ of the l_2-regularized logistic regression problem (3.42) in the lecture notes[2] is convex in θ.

$$\varphi(\theta) = \sum_{s \in S} \left(-y_s \langle \theta, x_s \rangle + \log \left(1 + 2^{\langle \theta, x_s \rangle} \right) \right) + \frac{\log e}{2\sigma^2} \|\theta\|_2^2 \tag{1}$$

[1] https://mlcv.inf.tu-dresden.de/courses/21-winter/ml1/ml1-lecture-notes.pdf