

# Regularization

TOTAL POINTS 5

1. You are training a classification model with logistic regression. Which of the following statements are true? Check all that apply.

1 point

- ☒ Adding a new feature to the model always results in equal or better performance on the training set.
- ☐ Adding many new features to the model helps prevent overfitting on the training set.
- ☐ Introducing regularization to the model always results in equal or better performance on examples not in the training set.
- ☐ Introducing regularization to the model always results in equal or better performance on the training set.

2. Suppose you ran logistic regression twice, once with  $\lambda = 0$ , and once with  $\lambda = 1$ . One of the times, you got parameters  $\theta = \begin{bmatrix} 74.81 \\ 45.05 \end{bmatrix}$ , and the other time you got  $\theta = \begin{bmatrix} 1.37 \\ 0.51 \end{bmatrix}$ . However, you forgot which value of  $\lambda$  corresponds to which value of  $\theta$ . Which one do you think corresponds to  $\lambda = 1$ ?

1 point

- ☒  $\theta = \begin{bmatrix} 1.37 \\ 0.51 \end{bmatrix}$
- ☐  $\theta = \begin{bmatrix} 74.81 \\ 45.05 \end{bmatrix}$

3. Which of the following statements about regularization are true? Check all that apply.

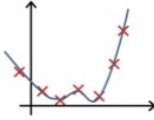
1 point

- ☐ Because logistic regression outputs values  $0 \leq h_{\theta}(x) \leq 1$ , its range of output values can only be "shrunk" slightly by regularization anyway, so regularization is generally not helpful for it.
- ☐ Because regularization causes  $J(\theta)$  to no longer be convex, gradient descent may not always converge to the global minimum (when  $\lambda > 0$ , and when using an appropriate learning rate  $\alpha$ ).
- ☒ Using too large a value of  $\lambda$  can cause your hypothesis to underfit the data.
- ☐ Using a very large value of  $\lambda$  cannot hurt the performance of your hypothesis; the only reason we do not set  $\lambda$  to be too large is to avoid numerical problems.

4. In which one of the following figures do you think the hypothesis has overfit the training set?

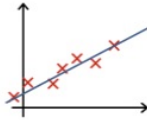
1 point

☒ Figure:

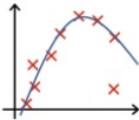


overfit

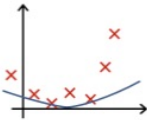
☐ Figure:



☐ Figure:



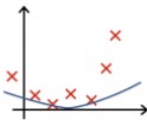
☐ Figure:



5. In which one of the following figures do you think the hypothesis has underfit the training set?

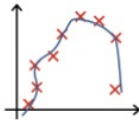
1 point

☒ Figure:

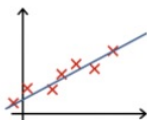


underfit.

☐ Figure:



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