Chapter 6 Quiz

6.Q.1

1/1 point (graded)

Suppose we estimate the regression coefficients in a linear regression model by minimizing

$$\sum_{i=1}^{n}\left(y_i-\beta_0-\sum_{j=1}^{p}\beta_j x_{ij}\right)^2+\lambda\sum_{j=1}^{p}\beta_j^2$$

for a particular value of λ. For each of the following, select the correct answer:

As we increase λ from 0, the training RSS will:

Steadily increase

✔ **Answer:** Steadily increase

Explanation

Increasing λ will force us to fit simpler models. This means that training RSS will steadily increase because we are less able to fit the training data exactly.

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Answers are displayed within the problem

6.Q.2

1/1 point (graded)

As we increase λ from 0, the test RSS will:

Decrease initially, and then eventually start increasing in a U shape

✔ **Answer:** Decrease initially, and then eventually start increasing in a U shape

At first, we expect test RSS to improve because we are not overfitting our training data anymore. Eventually, we will start fitting models that are too simple to capture the true effects and test RSS will go up.

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Answers are displayed within the problem

6.Q.3

1/1 point (graded)
As we increase λ from 0, the variance will:

Steadily decrease

✔ **Answer:** Steadily decrease

Increasing λ will cause us to fit simpler models, which reduces the variance of the fits.

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Answers are displayed within the problem

6.Q.4

1/1 point (graded)
As we increase λ from 0, the (squared) bias will:

Steadily increase

✔ **Answer:** Steadily increase

Increasing λ will cause us to fit simpler models, which have larger squared bias.

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Answers are displayed within the problem

6.Q.5

1/1 point (graded)

As we increase λ from 0, the irreducible error will:

Remain constant

Answer: Remain constant

Increasing λ will have no effect on irreducible error. By definition, irreducible error is an aspect of the problem and has nothing to do with a particular model being fit.

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Answers are displayed within the problem