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Week 12 Reading Questions

Q1 (2 pts.): In the context of a dataset (real or made up), describe the inherent conflict between using a complicated model that minimizes the unexplained variation and using a simple model that is easy to communicate.

In the context of a real or made-up data set, in a simple model, you are specific about the form the model will take beforehand. Using the simple model we maximize our likelihood, whereas, in the complicated model we collect our data but there are more things we have to estimate, such as the likelihood of observing our data and we need to have some prior idea of the value of our criteria is. In addition, a complicated model can use other numbers than 0 which makes it difficult to communicate. Both these methods can also be wrong.

Q2 (1 pt.): Which of the following predictor variables had slope coefficients that were significantly different from zero at a 95% confidence level? Select the correct answer(s)

water
nitrogen

Q3 (2 pts.): Using the information in the model coefficient table above, calculate the expected biomass for a plant given:

0 mL water per week
 $-1.7 \text{ (intercept)} + 0 = -1.7$

0 mg nitrogen per week
 $-1.7 \text{ (intercept)} + 0 = -1.7$

0 mg phosphorus per week
 $-1.7 \text{ (intercept)} + 0 = -1.7$

Explain how you made the calculation.

-1.7 because aren't adding any water so we are only looking at the intercept row and it is the same for the other variables.

Q4 (2 pts.): Using the information in the model coefficient table above, what is the expected biomass for a plant given:

10 mL water per week

$$0.043 \text{ estimate} * 10 \text{ mL water per week} - 1.7 \text{ intercept} = -1.27$$

30 mg nitrogen per week

$$0.192 \text{ estimate} * 30 \text{ mL water per week} - 1.7 \text{ intercept} = 4.06$$

20 mg phosphorus per week

$$-0.027 \text{ estimate} * 20 \text{ mL water per week} - 1.7 \text{ intercept} = -2.24$$

Explain how you made the calculation.

We made the calculation by taking the estimate of water, nitrogen, and phosphorus multiplying it by the mL per week minus the intercept.

Q5 (1 pt.): Describe the key difference between a simple linear regression and a 1-way analysis of variance.

The key difference between the two regression is used to make estimates or predictions for the dependent variable with the help of single or multiple independent variables.

Q6 (1 pt.): Identify the deterministic component(s) of the model equation.

β_1 is the deterministic component.

Q7 (1 pt.): Identify the stochastic component(s) of the model equation.

The ϵ is the stochastic component.