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ECO 602 – Analysis of Environmental Data
Week 10 Reading Questions
Due 11/13/2022

Q1 (1 pt.): Why would we want a model selection criterion to penalize the number of parameters in a model?

We want a model selection criterion to penalize the number of parameters in a model because this makes the model and data easier to interpret and because the predicted intervals and confidence bands will have better precision.

Q2 (3 pts.): In 2 - 3 short paragraphs, describe the meaning of the slope parameter β_1 in the context of the relationship between the predictor variable, x , and the response variable y .

The slope parameter, noted as β_1 , describes the relationship between the predictor variable, x , and the response variable, y . In the graphical context, slope indicates whether the “rise over run” relationship is positive or negative and details how much the value on the y axis changes with changes in the value on the x axis. Similar to how slope in a graphical context describes “rise over run,” the slope parameter does the same.

The slope parameter tells us how much the response variable changes with 1 unit of change in the predictor variable. The slope parameter indicates whether the relationship between the predictor and response variables is positive or negative. In describing the direction of the relationship and the degree of response variable change, the slope parameter helps us understand the nature of predictor-response variable relationship.

Q3 (1 pt.): Based on the model table, what is the base case water treatment?

Based on the model table, the base case water treatment is the low water level treatment.

Q4 (2 pts.): What is the average plant mass, in grams, for the low water treatment? How did you calculate this quantity?

The average plant mass for the low water treatment is 2.4 grams. This is because the slope estimate for the low water treatment is 2.4. Slope would usually be interpreted as “for every 1 unit increase in the predictor variable, you see [slope value] increase in the response variable.” Since we cannot interpret a one unit increase in water treatment as water treatment is categorical, we interpret the “estimate” value to be the mean plant mass rather than slope as low water treatment is the base case.

Q5 (2 pts.): What is the average plant mass, in grams, for the medium water treatment? How did you calculate this quantity?

The average plant mass for the medium water treatment is 3.7 grams. This is because the slope estimate for the medium water treatment is 1.3 which you add on to the base case which is 2.4.

Q6 (1 pt.): Which of the following questions cannot be addressed with the model coefficient table?

Select the correct answer or answers:

- A. Is there a positive relationship between increased water availability and plant biomass accumulation?**
- B. Is water availability a significant predictor for plant biomass accumulation?**
- C. What is the average biomass of plants in the high water treatment?**

Question B cannot be addressed with the model coefficient table.