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Week 2 Reading Questions

9/16/2022

ECO 602: Analysis of Environmental Data

**Q1: In 1 - 2 short paragraphs, explain the dichotomy in your own words and briefly describe how you might approach one of your research interests from each of the dichotomy endpoints.**

The deterministic-stochastic dichotomy describes how some models reflect the average expected pattern of the sample and other model the “noise” or variation from the overall pattern. Models that reflect the overall pattern are deterministic, and models that reflect the variation of the data away from the average pattern as stochastic.

I might approach my research on family forest owner attitudes toward forever wild conservation easements through a combination of both stochastic and deterministic models. I am interested in the overall patterns of which demographics and parcel characteristics are most likely to lead to consideration of forever wild conservation. This deterministic model will likely be the main focus of my research. However, it will be useful for a future extension publication to know the wide array of reasons that landowners may decide not to participate in forever wild conservation rather than just the most common reason. Understanding the varying reasons and their degrees of deviation from the average reason landowners are turned off from this land protection tool can inform conservation organizations’ future negotiations and conversations with hesitant landowners.

**Q2: Identify at least one source of bias or assumption (cultural, scientific, other). Hypothesize a practical impact these biases or assumptions might have on scientific communication and the effectiveness of management efforts? (1 - 3 paragraphs)**

The last quote about statistical evidence being required to defend scientific conclusions contains the assumption that statistical evidence is always calculated correctly and without bias, and that it is the strongest form of objective evidence. In reality, all statistics and models are derived by humans who bring in their own biases and assumptions about the world. This blind assumption that statistics are king can lead to an over-emphasis on certain statistical tests like confidence intervals and p-values in an assortment of science communication contexts e.g., funding opportunities, policy advisement, and management prescriptions. To give a more concrete example, the cultural bias that statistical tests are a prerequisite for “real” science can bar traditional ecological knowledge of indigenous groups from policy or management consideration.

**Q3: In 1 - 2 short paragraphs, describe the following:**

- 1. Identify and briefly define the two primary components of a model constructed in the dual model paradigm.**

The two primary components of a model constructed in the dual model paradigm are 1) deterministic models and 2) stochastic models. Deterministic models highlight the average behavior of the system. Stochastic models investigate the noise or variability of the system.

**2. Give an example of the two components in the context of a system you are interested in studying.**

The deterministic component of my system would be the average age of respondents to our mail survey who are interested in forever wild conservation. A stochastic component of my research would be measuring the non-response error introduced to our results due to potential survey participants ignoring the mail survey.

**Q4 (2 pts.): In 1 - 2 short paragraphs, describe the difference between a statistical and biological or ecological population. Which of these populations may vary depending on the spatial or temporal scale of the research question?**

The statistical population is usually a subset of the ecological population which is the entire species range. For example, the total number of swamp white oaks throughout the species range would be the ecological population for a study on the swamp white oaks of New York State. Conversely, the statistical population for that project would be all swamp white oaks within New York State. The statistical population may vary depending on the spatial or temporal scale of the research question.

**Q5: For each of your two chosen variables: Describe your proposed entity or variable and explain your chosen data type/scale is appropriate.**

We chose to focus on the white pine blister rust scenarios in the model thinking in-class activity. One categorical, nominal variable we could record could be ground cover species within 20 meters of infected white pines within in our sampling plots for white pine blister rust. Species is a categorical variable as species are divided into groups. Species is also a nominal variable because cannot be ordered or measured. A numerical variable on an interval scale that we could measure could be temperature at each plot. Temperature in degrees Fahrenheit or Celsius is numerical as it is quantitative, non-categorical data. It is interval data as there can be negative temperatures.