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Eco – 602, Analysis to Environmental Data

Week 2 Questions

Due: Sept 18, 2022

1. The phenomenological model is described to focus on the patterns that naturally occur within the data and utilize various distributions that are flexible enough to fit the data into and draw conclusions from it. It is typically used for data that is dynamic and the rates change during different periods of time. Compared to that of the mechanistic model, the phenomenological is typically less accurate when trying to extrapolate the data but somewhat more accurate when finding trends in the given data.

   In my research, I may attempt to use a phenomenological model when looking at plant germination rates between treatments and finding a model that best represents the overall trends of the data. This is especially important when evaluating whether a given treatment is beneficial or not to a certain treatment group. On the other hand, I may use a mechanistic model when I am looking at the underlying mechanisms that produce the data.

2. One source of bias with the "innocent until proven guilty" mindset is how black-and-white it is. Depending on your given results, there may be several reasons why your data isn't "statistically significant" enough to challenge the null hypothesis. By thinking that natural phenomena are either present or not present with nothing in between, you are ruling out a whole set of other possibilities where specific conditions drastically change the results of the experiment.

3. The dual model paradigm consists of deterministic models and stochastic models in order to evaluate whether an experimental set of data is "different" enough from the expected to be considered significant. In general, the deterministic model represents our expected dataset while the stochastic gives insights about the variation of the experimental compared to the average.

   In my field of study, these two components can be used to figure out whether a particular applied treatment has any effect on the growth/yield/elemental content of a plant compared to that of the control. The deterministic model would be used for the control treatments while the stochastic model would represent the treatment groups.

4. The statistical population encompasses all of the parameters that are being investigated for a specific research question while the ecological population represents all of the subjects of interest, everywhere. For example, if you were studying a particular parameter in a group of birds in a specific area, the statistical population would describe the subjects in that area while the ecological population would define all of that type of bird. The statistical population will change based on the scope of the research question.

5. Cattails, A numerical variable on an interval scale – This could measure the % change in cattail plants over time and it is appropriate because counts are numerical and there can be zeo or negative % change.

Cattails, A discrete variable – This could represent the number of people who visit an area with an increasing cattail population and how it relates to the intensity of overpopulation. This works because counts cannot be intermediate values.