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Submitted: November 1, 2022
I didn't work with other students.

ECO 602 – Week 8 Reading Questions

Readings

- Slide deck 6
- McGarigal Ch 7: Nonparametric Inference : Ordinary Least Squares and More
- McGarigal Ch 8: Maximum Likelihood Inference
- ***Optional*** Skim McGarigal Ch 8: Bayesian Inference

Parametric/Non-Parametric

Refer back to sections 7.1 and 8.2 for McGarigal's descriptions of the form of the linear statistical model for the non parametric OLS and parametric likelihood-based inference techniques.

- Recall that he used the same data to illustrate both paradigms: Brown creeper abundance (response) and proportion of late successional forest (predictor).

Note: McGarigal specifies the parametric model using this notation:

$Y \sim Normal(a+bx,\sigma)$

However, both the parametric and non parametric model can be expressed in the more familiar regression model format:

$yi=\beta 0+\beta 1xi+ei$

Q1 (1 pt.): Describe the key difference between the non parametric model (Ch. 7.1) and the parametric model (Ch. 8.1)

A non-parametric model is based on the sample rather than the underlying population from which the sample was drawn. This approach does not include making assumptions about the distribution of the stochastic portion of the data. Since we aren't making assumptions about the error/residual portion of the model, we are actually only working with the deterministic part when using non-parametric methods. So this notation applies, but the error term at the end is not specified - $yi=\beta 0+\beta 1xi+ei$. It is more difficult to make predictions with this type of model.

In contrast, a parametric model involves assuming that the stochastic portion of the model with the error/residuals follows a known probability distribution. This allows us to make assumptions about the underlying population from which the sample was drawn. We can use the same notation as for non-parametric models and the error term at the end is specified - $yi=\beta 0+\beta 1xi+ei$. One of the advantages of this type of model is that we can make predictions.

Interpolation/Extrapolation

Q2 (1 pt.): What is the difference between interpolation and extrapolation?

Interpolation is using the statistical model to predict point or interval values within the range of data that we actually measured. Extrapolation is using the chosen statistical model to predict point or interval values beyond the range of data that we measured, so the predictions are for future time points or for areas that weren't actually sampled.

Q3 (1 pt.): Explain why extrapolation has more pitfalls than interpolation.

Extrapolation has more pitfalls because our choice of model can result in a wide variation of predictions beyond the range of our data. It is especially difficult to provide an interval estimate for the predicted point values, since our assumptions about the residual component can't be based on an actual sample of data.