Week #8 Reading Questions Responses

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

Nonparametric inference is used when it is not possible to use a known probability distribution to describe the stochastic part of the model. Therefore, they do not make an explicit link to the underlying population from which the sample was taken from. Nonparametric inference is based on the sample itself and has weak inferential power relative to parametric inference. The distribution of the error component is not specified in the model. Ordinary Least Squares is one example of a nonparametric method.

Parametric inference is used when it is possible to use a known probability distribution to describe the stochastic part of the model and therefore an explicit link to the underlying population can be made. The distribution of the error component is specified in the model. Maximum likelihood can be used to calculate confidence bounds on parameters.

1. Interpolation and extrapolation may both be used to make predictions. What is the difference between interpolation and extrapolation?

Interpolation is a prediction about the measured range of data such as predicting values for future observations. Extrapolation is a prediction beyond the measured range of data such as predicting values for sites not sampled.

1. Explain why extrapolation has more pitfalls than interpolation.

Extrapolation can be more difficult to perform compared to interpolation. This is because we can easily make predictions of expected values from new observations using deterministic models but calculating the confidence prediction limits without a stochastic model on these predictions is more difficult. Choosing the wrong model can therefore lead to wildly different predictions beyond the measured range of data.