

1. Describe the key difference between the non parametric model (Ch. 7.1) and the parametric model (Ch. 8.1),
  - a. A non-parametric model, as described by McGarigal in 7.1, does not specify a known probability distribution or stochastic component. Instead, all inferences are based on the sample, and as such does not link directly to the population from which the sample is drawn. Parametric models, on the other hand, specify both a deterministic and error (stochastic) component.
2. Interpolation and extrapolation may both be used to make predictions. What is the difference between interpolation and extrapolation?
  - a. Interpolation is used to make predictions within the measured range of the data--for example, if you have data points at (1,6) and (5, 12), you would use interpolation to estimate the y value at  $x = 2$  or  $x = 4$ . Extrapolation, on the other hand, is used to make predictions outside of the measured range of data. Drawing on the same values mentioned previously, extrapolation would be used to estimate the y value at  $x = 0$  or  $x = 6$ .
3. Explain why extrapolation has more pitfalls than interpolation.
  - a. In the broadest sense, extrapolation is riskier than interpolation because the estimate is only informed from one side, and as such is very dependent on the correct choice of model. When interpolating, any seriously considered model should fit the existing data, and as such the y value being interpolated will be similar across those models. However, once outside of the existing data the various models will likely diverge, meaning that possible extrapolated values will diverge as well.