

Lab 4 Assignment

- The Cyclostome Data.txt file contains data that quantifies changes in the dominance of cyclostome bryozoans over the 100 m.y. of their evolutionary history.
 - Plot these data and conduct a linear regression analysis using an appropriate regression model.
 - In the context of your analysis decide whether these data are better modeled using a single regression line or a set of disjunct regression lines.
 - Justify your decision.
 - If you opt for the latter identify the age date of the most likely disjunction and propose a reason for why the disjunction might have occurred.
- The following datasets contain information regarding the relations between density and seismic P-wave velocity for different igneous rock types: Biotite-Amphibole Gneiss.txt, Diorite.txt, Granite.txt, Granulite.txt, Kyanite-Garnet-Biotite Gneiss.txt.
 - Plot these data. Select an appropriate linear regression method to model this relation.
 - Determine which, if any, of these data exhibit a statistically significant linear relation at the 95% confidence level.
 - Order the rock types that do exhibit a significant linear relation according to increasing rate of P-wave transmission.
- The datafiles Species 1.txt and Species 2.txt contain information about length and width measurements collection from two bivalve species.
 - Plot these data.
 - Model the linear relation between these variables for both species using an appropriate regression model.
 - Based on these models, test the proposition that there is no difference in these species' length/width regressions.
 - Accept the null hypothesis if there is more than a 5% chance of it being correct.
- The Copper.txt file contains information about the percent copper concentration along a vein of ore being considered for mining.
 - Plot these data.
 - Select an appropriate linear or curvilinear regression method to model this relation.
 - Confirm the appropriateness of the model you select by performing an analysis of residual variations about the regression line.
- The Sherwood Sandstone.txt file tabulates five different parameters that effect the movement of fluids through this sedimentary rock body.
 - Plot these data, then use multiple regression analysis to express the linear relation between porosity, connectivity, formation factor and polarization on permeability.
 - Identify all independent variables that exhibit a statistically significant relation with permeability at the $p = 97.5\%$ confidence level.
 - Confirm the validity of your interpretation by conducting an analysis of the regression residuals.
- The Cities.txt files contains data that quantify relations between SO₂ pollution levels and a variety of potential controlling factors.
 - Using these data evaluate the following two path diagrams.
 - Which scenario explains the greatest proportion of the observed data?

