

APM 630 Regression Analysis

Project #5 – Residual Analysis

Data: Brain.xls

Data on body weight and brain weight of animals were collected with two variables

- Y – Brain weight (g)
- X – Body weight (kg)

Assignment:

1. Compute Pearson and Spearman correlations between the variables (Y vs X).
2. Draw a scatterplot of Y and X variables.
3. Compute the natural log-transformation for both variables (lnY and lnX).
4. Compute Pearson and Spearman correlations between the variables (lnY vs lnX).
5. Draw a scatterplot of ln(Y) and ln(X).
6. Fit the OLS model $Y = \beta_0 + \beta_1 X + e$ to the data, and obtain the residual plot and student residual plot. For the model residuals, test for (1) normality, (2) homogeneity of variance, (3) possible outliers, and (4) autocorrelations.
7. Fit the log-transformed model $\ln(Y) = \beta_0 + \beta_1 \ln(X) + e$ to the data, and obtain the residual plot and student residual plot. For the model residuals, test for (1) normality, (2) homogeneity of variance, (3) possible outliers, and (4) autocorrelations.

SAS help for scatterplots and residual plots

```
PROC PLOT;
```

```
  PLOT Y*X='*';
```

```
  PLOT LNY*LNx='*'; $ SPCS;
```

```
RUN;
```

```
PROC PLOT;
```

```
  PLOT RESIDUAL*PREDICT='*'; $ SPCS / VREF=0;
```

```
  PLOT STUDENT*PREDICT='*'; $ SPCS / VREF=0 VREF=2 VREF=-2;
```

```
RUN;
```