STAT 3611   Lab 9   Spring 2015   Maghsoodloo

1. Enter the data of the Example on p. 156 of my notes on a Minitab worksheet, staring in C1. Use Minitab's General Regression to obtain the regression function of y on x (i.e., the functional relationship of y on x), and also using Minitab's "Results" to obtain CI on coefficients. Further, use Minitab's Storage to obtain the fitted vector $\hat{\mathbf{Y}},$ the residual $\mathbf{e},$ the Studentized residuals $\mathbf{r}$ and the matrix $\mathbf{C} = \mathbf{A}^{-1} = (\mathbf{X}^T\mathbf{X})^{-1} = (\mathbf{X}'\mathbf{X})^{-1}.$ Then, use Minitab's Data, scroll down to Display data to output the matric $\mathbf{C}$.

2. **U**se the data of my Example 45 on pp. 166-170 of my notes onto the same Minitab worksheet (X = Engr Statistics on C7, & Y = OR averages in percent on C8). Go to Stat → Basic Statistics → Scroll down to → correlation. The dialogue box should be self-explanatory (click only on display *P*-value); then ok. Write your SI on the MPR. In order to obtain the correlation matrix, repeat the above procedure but click on Store matrix → ok → Data → Scroll down to Display Data and double click on Corr1.

3. Minitab does not provide CIs for Pearson's Product-moment correlation coefficient ρ at the present time. Thus, save the data Excel file as Lab9Soln in order to obtain the 2-sided CI for the population correlation coefficient ρ, using the following formulas: compute raw statistics $\sum_{i=1}^{19} x_i$, $\sum_{i=1}^{19} y_i$, $\sum_{i=1}^{n} x_i^2$, $\sum_{i=1}^{n} y_i^2$, $\sum_{i=1}^{n} x_i y_i$, and CFs; then use these to compute S_{xx} , S_{yy} , S_{xy} , S_x , S_y, $r = S_{xy}/(S_{xx}S_{yy})^{0.5}$. Next compute Z =

$\dfrac{1}{2}\ln(\dfrac{1+r}{1-r}) = \tanh^{-1}(r)$ and use MS Excel function atanh(r) to verify the value of Z

$=\dfrac{1}{2}\ln(\dfrac{1+r}{1-r})$. Then compute $L = Z - 1.96/\sqrt{n-3}$ and $U = Z + 1.96/\sqrt{n-3}$. Now compute $\rho_L = \tanh(L)$ and $\rho_U = \tanh(U)$. Using this CI, can you reject H₀: ρ = 0.60 at the 5% level?