

Math 6020-1, Spring 2015; Assignment 1

Assigned on Friday January 17, 2014;
Due on Friday February 13, 2014

1. Read Chapter 7; skim through Chapters 1–6, making sure that you know where everything is in this background material [in case you need to revise/refresh your knowledge of those topics].
2. In R, use the command `data("USairpollution")` to download data on various airpollution information. This is public domain data and freely available in R. You can find a little more documentation on this dataset at the website <http://www.stats4stem.org/r-usairpollution-data.html>.
3. Perform normal qq-plots [`qqnorm` in R] on each of the variables `SO2`, `temp`, `manu`, `popul`, `wind`, `precip`, and `predays`. In R you can try the command `layout` to produce several plots back to back. Do you notice any candidates for outliers? Which ones? How did you decide on your choice[s]?
4. Run a 2-D multilinear model with $y_1 = \text{SO2}$ and $y_2 = \text{temp}$. Show your parameter estimates, together with individual tests for $H_0 : \beta_{\text{manu}} = 0$, \dots , $H_0 : \beta_{\text{predays}} = 0$.
5. Can you describe a 90% confidence ellipsoid for $\beta := (\beta_{\text{manu}}, \dots, \beta_{\text{predays}})$? [I am not asking for a 5-D plot, of course. The question is asking you to find a different description.]