36-617: Applied Linear Models
Fall 2021
HW02 – Due Mon Sep 13, 11:59pm

- Please turn the homework in online to GradeScope in our course webspace at canvas.cmu.edu. The easiest way to do this is to go to the Assignments area of our Canvas webspace, then click on the assignment, then use the link there to submit to Gradescope.

  - Please upload only _one_ file (pdf format ONLY) for each homework assignment. If you are an RStudio user, the easiest way create a pdf file to submit is to make an RMarkdown file for your homework solutions, and then "knit" it to pdf. Other approaches such as making an MSWord file or LaTeX file and converting it to pdf, or writing things out by hand and scanning to pdf with your phone, etc., are also acceptable.

  - If you need additional help with this, please see https://www.cmu.edu/teaching/gradescope/index.html. Also, allow yourself some extra time to create the pdf & upload it in Gradescope.

  - Gradescope allows the TA to grade all the problem 1's together, then all the problem 2's, and so forth. This leads to more consistent grading and better comments for you.

- Data files (where needed) for these exercises are in the "0 - textbooks" folder in the files area on canvas.
- Reading:

  - For next week, please read Sheather Ch 3. There will be a reading quiz on Monday!

  - (We will skip Sheather Ch 4 for now, and proceed to Ch 5, for the week of Sept 20).

- There are three exercises.

Exercises

1. Sheather, Ch 3, pp 109ff, #5
2. In the folder for this hw assignment you will find a pdf called "COVID breakthrough rates in England". This is a recent article from the medical journal *The Lancet*.

   - Note that the article is exactly in IMRAD format, with sections labelled "Introduction", "Methods", "Results" and "Discussion". If we were going to convert it to IDMRAD format, we could simply move the portion of the "Methods" section before the "Statistical analysis" subhead on p. 4 into a new "Data" section between "Introduction" and "Methods". (You do not have to do this, but it is worth thinking about).

   - The Abstract has a special form, called a "structured abstract", in which there is a short, labelled, paragraph corresponding to each section of the paper. We will not be writing structured abstracts in our class (we will write shorter one-paragraph abstracts), but it is good to see the additional information that a structured abstract can contain.

   For our IDMRAD papers we generally will want shorter abstracts, with up to five sentences, one sentence for each section of the paper. Here I want you to write two different abstracts for the paper:

(a) Write a one-paragraph abstract with exactly four sentences, one for each section of the paper: Introduction, Methods, Results and Discussion. Each sentence should highlight the main point of each section, and together the four sentences should tell the story of the paper. The last sentence should include the main result of the paper.

(b) Now, imagine that this is an IDMRAD paper, with the data section containing the material before the "Statistical analysis" subhead on p. 4 (as described above). Write a one-paragraph abstract with exactly five sentences, one for each section of the paper: Introduction, Data, Methods, Results and Discussion. Each sentence should highlight the main point of each section, and together the five sentences should tell the story of the paper. The last sentence should include the main result of the paper.

3. In the folder for this hw assignment you will find a pdf called "An IMRAD paper on wine", based on Example 1.2.4 in Sheather. This paper is based only on EDA, not on any more sophisticated methods.

(a) Does the paper appropriately address each of the parts of an IMRAD paper as described on slide 3, lecture 04 from week02 of class? If you need more detail on the sections of an IMRAD paper, see `http://www.jpgmonline.com/documents/author/24/2_Aggarwal_10.pdf`.

For each section below, either say "yes this section has the right content", or say "no" and describe what is missing and/or what needs to be moved to another section of the paper or deleted.

- Abstract
- Introduction
- Methods
- Results
- Discussion

(b) As described on slide 5 of the same lecture, an IDMRAD paper is a bit different in that there is a **Data** section between the **Introduction** and the **Methods** sections, devoted to a description of the data used in the paper.

Please write the appropriate **Data** and **Methods** sections for this paper (just those two sections), as an IDMRAD paper instead of an IMRAD paper (include appropriate text, figures and tables in the two sections). For your convenience the three figures and three tables of this paper are saved as jpg files in the folder for this assignment.