MATH 265
Write-up 1
Due 25 September 2023

In groups of one or two, for this assignment:

1. Select a subset of 10 recent movies (after 2000) from a particular genre or year. Please be creative with this, but make sure each movie has enough data that you can easily find.

2. Go through a website like The Numbers for budgets, IMDb for movie ratings to gather a good set of data. See this link for an example of movie comparisons on www.the-numbers.com. Other sorts of data you may consider are: social media followers of leading actors/actresses, producer or directors' previous films (appropriately quantified in some manner), scores on Rotten Tomatoes, how many times a trailer has been viewed on YouTube prior to the release, etc.

3. Present your data in a clear manner (preferably in a table like the one from the notes on Day 3's lecture– I can give you this LaTeX code if you'd like).

4. Create various models using the data of your choosing to predict the worldwide box office sales. You should create:

   (a) A linear model of one variable,

   (b) A quadratic model of one variable,

   (c) A linear model of two variables,

   (d) A quadratic model of two variables,

   (e) A linear model of three variables.

   Each of these models does not need to use the subsets of the same data set. For example, your linear model of one variable may be with budget while your linear model of two variables may consider IMDb rating and a leading actress's social media following.

5. For each model, write out what system you're solving mathematically to determine parameter values. This can be done in a similar style to what we did on: pages 1 and 3 of Day 3's lecture in setting up systems with multivariate regression. You should also explicitly detail what is being optimized with the system you're solving.

6. For each model, comment on if the model is good. One idea you could discuss here are: Does the model agrees with what you'd expect intuitively? (For example, if your model predicts movie with \$0 production budget corresponds to the highest box office sales, does this match what we'd expect intuitively?)

7. Present your best model, and comment on why it's the best model of the ones you created.

8. Use your model to predict the success of a movie that has recently been released or is set to be released soon. (Please pick a film where you're able to get the relevant data for your model though!)

For write-ups, in general:

1. The write-up should have sections for: problem statement, description of mathematics, coding, results, and a discussion/conclusion.

2. The write-up should be typed in LaTeX using the template on Blackboard.

3. The write-up should be written in a way that a student (having taken Calculus II) could understand what is being done. Your writing should also be able to 'stand alone'; that is, your target audience should *not* just be someone familiar with the topics we've gone over in class.

4. You should aim to have your writing flow well. Your work doesn't need to be a page-turner or anything super exciting, but a reader shouldn't struggle to finish reading it.