Materials I Need to Know to Solve This Problem:
- Precipitation in Alaska
- What are you predicting?
  - What equation are you using?
- What is a basis function
- What is a linear combination of basis functions - **project 2 folder p1_basis….**
- What is a radial basis function - **p1_basis…, p2_basis…**
- What is a least squares pipeline - **chapter 8.2**

Definitions:

Basis Functions- Elements of a function that can be linearly combined to make a set of functions

Radial Basis Functions- The principle of radial basis functions (RBF) is to use linear combination of radial basis functions to approximate a function. The radial basis functions are usually global functions in the sense that its support spans over the entire domain.

Notes:
- Two Categories of tasks can be set up as regression problems
  - Factor Analysis- see what factors are most important to car buyers
  - Prediction- predicting price based on factors
- Data is from US NOAA
- Analyzing data from July 2020 in Alaska
- Only how basis functions are combined must be linear
- Basis functions can be non linear
- We are learning how to take a nonlinear basis function called the radial basis function and apply it towards surface regression
- NOAA records data in 5km increments longitudinally and latitudinally using estimation from regression
- Altitude differences and geographically barriers affect accuracy of results
- In this case x^k, 0<k<m are the basis functions

First:
- p1–basis… folder is an intro to the radial basis function
- p2-basis… use knowledge on rbf and least squares pipeline to perform a surface regression

Task 1:
- Review **Section 8.3** and **9.7** in textbook
- I will create a regressor matrix Φ to find optimal coefficients for Eq.1 (below)
- $y^\wedge = a_1 + a_2x + a_3x^2 + a_4x^3$
- $a^* = \text{argmin} \|Y-\Phi a\|^2$

Task 2:
- Manually fit initial function by model composed of just 2 rbf's
- Take knowledge learned in part A and use it to define a larger rbf based model

Task 3:

- Modify Helper functions
- Calculate the model weights
- Inference- predict precipitation given coordinates
- Plot the surface- create codes to create a model

Tasks Assignments:

Go Over p1 and p2 folders individually

Task 1- Sunday 4/10/2022
Work on it individually and share answers

Submit Links- 4/10/2022

Task 2-
Part A: Quinn and Myles - **Wednesday 4/13/2022**
Part B: Jordan and Thailer - **Sunday 4/17/2022**

Task 3- Sunday 4/24/2022
Part A: Myles
Part B: Jordan
Part C: Thailer
Part D: Quinn

Repository Link:
https://github.com/QPow3401/ROB_Project