CMSC 150 - PROJECT

USER MANUAL

By Tumpalan, John Karl B.

I. ABOUT

This program is a compilation of two generic solvers (Polynomial Regression and Quadratic Spline Interpolation) and a specific solver for a minimization problem using the simplex method. The two generic solvers were done and programmed according to the process of numerical methods discussed in the lecture and laboratory classes. The Simplex Method was solved using the Dual Simplex Method wherein the problem will be converted to a maximization problem to get the optimal solution for the minimization.

The solvers are programmed in R and the User Interface was created using the 'Rshiny' library. Matrix input in the simplex method was from the 'shinyMatrix' library.

II. Set-up options

A. SET-UP THE APP IN LINUX TERMINAL (1st option)

1.) Open the terminal

2.) type 'R' to enter R interpreter

Note: If Rshiny library is not installed,

2.b.) type "*install.packages('shiny')"* in the R interpreter

2.c.) type *"install.packages('shinyMatrix')"*

3.) type "*library(shiny); runApp('<enter absolute path of the file>')*"

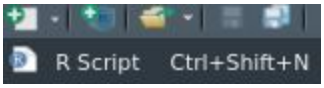
```
> library(shiny); runApp('Desktop/CMSC150/Project/tumpalan_project.R')

Listening on http://127.0.0.1:4981
```

B. SET-UP THE APP IN RSTUDIO (2nd option)

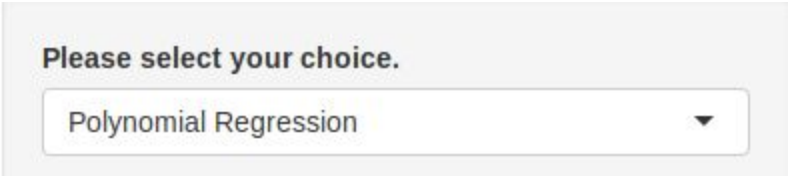
1.) Open Rstudio and install the rshiny library

2.) Open the R script in the workspace. (Ctrl+Shift+N to locate the R script)



2.) Click 'Run App' in the top right corner of the workspace

Choose the generic solver in the selectInput panel provided in the sidebar panel of the user interface

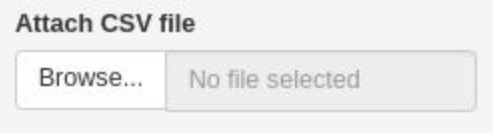


- Conditional numeric and file input are going to change depending on the first selectInput panel in the UI.

III. Polynomial Regression

---

a. Attach CSV file to the fileInput panel



b. Choose a valid polynomial order from 1 to n-1
c. Input a real number to estimate

Once valid inputs are loaded in the sidebar panel, the main Panel will load the answers based on the given data.

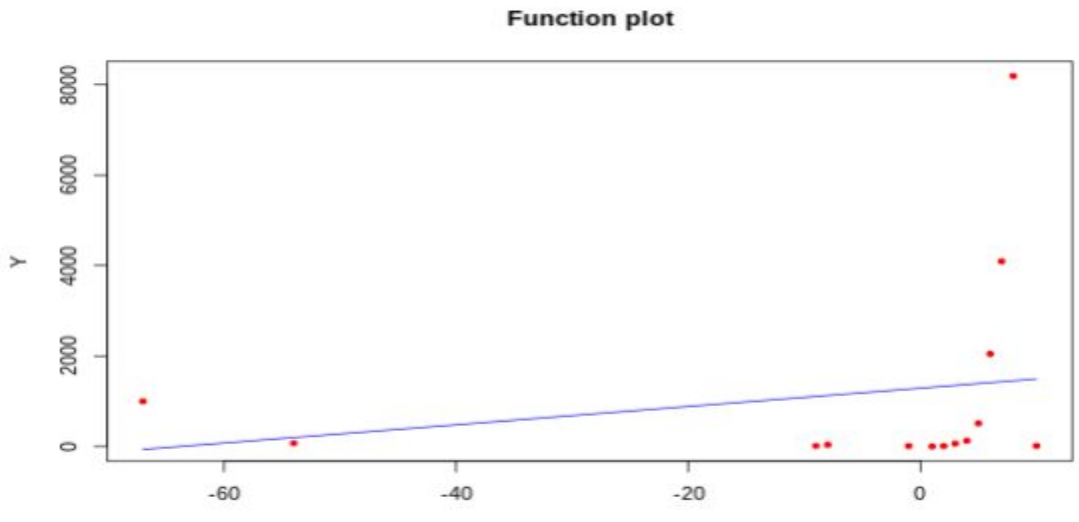
POLYNOMIAL FUNCTION:

FUNCTION(X) 20.21182183357 84 * X ^ 1 + 1290.4071021802

ESTIMATE OF F(X):

1310.619

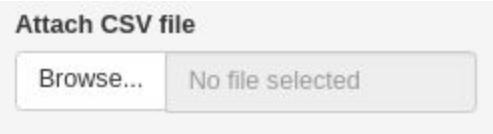
PLOT OF FUNCTION



IV. Quadratic Spline Interpolation

---

a. Attach CSV file to the fileInput panel



b. Input a real number to estimate

- Like the Polynomial Regression, once the data is loaded in the sidebar panel, the main panel will update with data based on the csv input.

Ex.

SPLINES:

Intervals	Functions
[-9 to 2]	function(x) -4.45454545454546*x +11.9090909090909
[2 to 6]	function(x) 1.23863636363636*x^2 +-9.40909090909091*x +16.8636363636364
[6 to 8]	function(x) 19.5227272727276*x^2 +-228.818181818184*x +675.090909090926
[8 to 9]	function(x) -112.545454545455*x^2 +1884.27272727273*x +-7777.27272727272
[9 to 10]	function(x) 94.5454545454533*x^2 +-1843.36363636361*x +8997.09090909079
[10 to 15000]	function(x) -0.00317223429645254*x^2 +47.6088992313812*x +-457.771768884166
[15000 to 15600]	function(x) 0.0797552161036593*x^2 +-2440.21461277198*x +18658218.5682563

ESTIMATE OF F(X):

7.454545

V. Simplex

---

a. Manipulate the R shiny values in the table given in the UI

	Sacramento	Saltlake	Albuquerque	Chicago	New York
Demands	0	0	0	0	0

	Supply	Shipping costs (Sacramento)	Shipping costs (Saltlake)	Shipping costs (Albuquerque)	Shipping costs (Chicago)	Shipping costs (New York)
Denver	0	0	0	0	0	0
Phoenix	0	0	0	0	0	0
Dallas	0	0	0	0	0	0

b. Change the selectInput panel if you want to see the solution and process in solving the minimization problem.

- If show tableau was chosen, basic solution and tableaus for iterations are displayed in the main panel of the app.

c. The minimum total cost of the problem will be displayed in the sidebar layout of the UI.

Ex.