

USER'S MANUAL

CMSC 150 FINAL PROJECT

ANARETA, NADINE

CMSC 150 - B2L

2022 - 12005

QUADRATIC SPLINE INTERPOLATION

Quadratic Spline Interpolation is a method to curve fit data. Piecewise quadratics approximate the data between two consecutive data points, and fit an interpolating quadratic spline through the data.

Upload a CSV File;
Automatically sorts the
variables if unsorted

Enter a valid
estimate value

Click **PLOT**
button for
output

QUADRATIC SPLINE INTERPOLATION

CHOOSE CSV FILE:
 No file selected

ENTER ESTIMATE:

[Plot](#)

Estimated Value

Correct Function for the Estimate

Function Per Interval

Quadratic Spline Interpolation Graph

Prints all
output

Error and Warning Messages

QUADRATIC SPLINE INTERPOLATION

CHOOSE CSV FILE:
 No file selected

ENTER ESTIMATE:

[Plot](#)

Estimated Value

Correct Function for the Estimate

Function Per Interval

Quadratic Spline Interpolation Graph

Prints an error message
when either or both input
values are missing

No File Attached

Invalid Estimate Value

Successful Quadratic Spline Interpolation

QUADRATIC SPLINE INTERPOLATION

CHOOSE CSV FILE:

ENTER ESTIMATE:

Values of x: 3, 4.5, 7, 9
[PLOT](#)

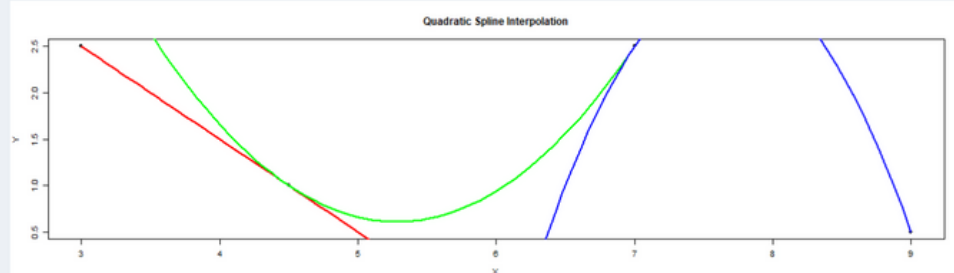
Estimated Value

Correct Function for the Estimate

Function Per Interval

Quadratic Spline Interpolation Graph

Outputs the estimated
value, correct function,
functions per interval, and
its graph



POLYNOMIAL REGRESSION

In polynomial regression, it describes the relationship between the independent variable x and the dependent variable y using an n th-degree polynomial in x .

Upload a CSV File

Input a valid degree value

Enter a valid estimate value

Click **PLOT** button for output

POLYNOMIAL REGRESSION

CHOOSE CSV FILE:
 No file selected

ENTER DEGREE:

ENTER ESTIMATE:

Estimated Value

Polynomial Function

Polynomial Regression Graph

Prints all output

Error and Warning Messages

POLYNOMIAL REGRESSION

CHOOSE CSV FILE:
 No file selected

ENTER DEGREE:

ENTER ESTIMATE:

Prints an error message when one input values are missing

POLYNOMIAL REGRESSION

CHOOSE CSV FILE:
 input_poly_1.csv

ENTER DEGREE:

ENTER ESTIMATE:

No File Attached

Successful Polynomial Regression

POLYNOMIAL REGRESSION

CHOOSE CSV FILE:
 input_poly.csv

ENTER DEGREE:

ENTER ESTIMATE:

Slider input for degree value updates depending on x values

Outputs the estimated value, polynomial function, and its graph

Estimated Value
61.02

Polynomial Function

```
function (x) 2.25079365079363 * x ^ 0 + 3.39947089947099 * x ^ 1 + 1.2912698412698 * x ^ 2 + 0.0759259259259305 * x ^ 3
```

Polynomial Regression Graph

SIMPLEX METHOD FOR MINIMIZATION

One solution to this is by reconstructing our minimization problem to a maximization problem by converting it to a dual problem and using the simplex method that we've discussed before to solve the dual problem.

Includes select all/none buttons to be user-friendly

Nothing selected

Select All Deselect All

Frozen Broccoli
Carrots, Raw
Celery, Raw
Frozen Corn
Lettuce, Iceberg, Raw

Click **SOLVE** button for output

SIMPLEX METHOD

Diet Solver

SELECT/DESELECT FOOD:

Nothing selected

SOLVE

CHOSEN FOOD:

Prints all output

Result Table

Final Solution

Basic Solutions

Initial Tableau

Matrix Per Iteration

Error and Warning Messages

SIMPLEX METHOD

Diet Solver

SELECT/DESELECT FOOD:

Nothing selected

SOLVE

CHOSEN FOOD:

No Selected Food

Result Table

Food	Serving	Cost
Total Cost	>>>	0

Final Solution

No Selected Food

Basic Solutions

No Selected Food

Initial Tableau

No Selected Food

Matrix Per Iteration

No selected food

SIMPLEX METHOD

Diet Solver

SELECT/DESELECT FOOD:

Frozen Broccoli, Carrots, Raw, Celery, Raw, Frozen Cor

SOLVE

CHOSEN FOOD:

Total of 6 food:
Frozen Broccoli + Carrots, Raw + Celery, Raw + Frozen Corn + Lettuce, Iceberg, Raw + Peppers, Sweet, Raw

Result Table

Food	Serving	Cost
Total Cost	>>>	0

Final Solution

[1] "The Problem is Infeasible"

Basic Solutions

[1] "The Problem is Infeasible"

Initial Tableau

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24	
1	73.8	0.0	0.0	68.2	13.6	0.0	0.0	1007.4	100.0	2.0	17.8	0.0	-48.2	-13.6	-0.5	-0.8	-1007.4	-100.0	-2.0	-1.0	-0.0	-0.0	-0.0	-0.0	-0.0
2	23.7	0.0	0.1	19.2	5.6	1.6	0.6	15471.0	5.1	14.9	0.3	-23.7	0.0	-0.1	-19.2	-5.6	-1.6	-0.6	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
3	6.318e+00	0.0	9.965e-02	3.473e-01	1.480599	6.945e-01	2.979e-01	0	2.782e+00	1.595e+01	1.990e-01	-6.318e+00	0.0	-9.965e-02	-3.473e-01	-1.480599	-6.945e-01	-2.979e-01	0	-2.782e+00	-1.595e+01	-1.990e-01	6.318e+00	0.0	9.965e-02

Matrix Per Iteration

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24	
1	6.481e+01	0.0	7.621e-01	6.092e-01	11.476192	7.893e+00	7.772e+00	0	1.583e+02	1.533e+02	2.186e+00	-6.481e+01	0.0	-7.621e-01	-6.092e-01	-11.476192	-7.893e+00	-7.772e+00	0	-1.583e+02	-1.533e+02	-2.186e+00	6.481e+01	0.0	7.621e-01
2	1.532e+03	0.0	6.464e-06	1.241e-03	0.800362	1.034e-04	3.878e-05	1	3.296e-04	9.631e-04	1.939e-05	-1.532e+03	0.0	-6.464e-06	-1.241e-03	-0.800362	-1.034e-04	-3.878e-05	-1	-3.296e-04	-9.631e-04	-1.939e-05	1.532e+03	0.0	6.464e-06
3	6.318e+00	0.0	9.965e-02	3.473e-01	1.480599	6.945e-01	2.979e-01	0	2.782e+00	1.595e+01	1.990e-01	-6.318e+00	0.0	-9.965e-02	-3.473e-01	-1.480599	-6.945e-01	-2.979e-01	0	-2.782e+00	-1.595e+01	-1.990e-01	6.318e+00	0.0	9.965e-02

Still outputs the initial tableau despite infeasible solution

Infeasible solution maybe caused by a negative pivot element

Successful Simplex Method for Minimization

SIMPLEX METHOD

Diet Solver

SELECT/DESELECT FOOD:

Frozen Broccoli, Carrots, Raw, Celery, Raw, Frozen Cor

SOLVE

CHOSEN FOOD:

Total of 64 food!
Frozen Broccoli + Carrots, Raw + Celery, Raw + Frozen Corn + Lettuce, Iceberg, Raw + Peppers, Sweet, Raw + Potatoes, Baked + Tofu + Roasted Chicken + Spaghetti W/ Sauce + Tomato, Red, Ripe, Raw + Apple, Raw, W/ Skin + Banana + Grapes + Kiwifruit, Raw, Fresh + Oranges + Bagels + Wheat Bread + White Bread + Oatmeal Cookies + Apple Pie + Chocolate Chip Cookies + Butter, Regular + Cheddar Cheese + 3.3% Fat, Whole Milk + 2% Lowfat Milk + Skim Milk + Poached Eggs + Scrambled Eggs + Bologna, Turkey + Frankfurter, Beef + Ham, Sliced, Extralean + Kielbasa, Prk + Cap'n Crunch + Cheerios + Corn Flks, Kellogg's + Raisin Brn, Kellogg's + Rice Krispies + Special K + Oatmeal + Malt-O-Meal, Choc + Pizza W/ Pepperoni + Taco + Hamburger W/Toppings + Hotdog, Plain + Couscous + White Rice + Macaroni, Ckd + Peanut Butter + Pork + Sardines in Oil + White Tuna in Water + Popcorn, Air-Popped + Potato Chips, Bbqflvr + Pretzels + Tortilla Chip + Chicknood Soup + Split Pea + Ham Soup + Vegetbeef Soup + Neweng Clamchow + Tomato Soup + New Eclamchow, W/ Milk

Result Table

Food	Serving	Cost
Carrots, Raw	0.235817810889785	0.016507246762285
Potatoes, Baked	3.54494477652081	0.212696686591249
Skim Milk	2.16784936259487	0.281820417137334
Peanut Butter	3.60077591465083	0.252054314025558
Popcorn, Air-Popped	4.82322907012973	0.192929162805189
Total Cost	>>>	0.956007827321615

Final Solution

	x2	x7	x27	x49	x53	
	0.2358	3.5449	2.1678	3.6008	4.8232	0.9560

Basic Solutions

[[1]]

[1] 5.000e-02 6.000e-02 1.200e-01 4.525e-06 1.600e-01 1.700e-01 1.335e-01 3.976e-02 1.795e-01 1.970e-02 5.279e-01

Initial Tableau

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24
1	73.8	0.0	0.0	68.2	13.6	0.0	0.0	1007.4	100.0	2.0	17.8	0.0	-48.2	-13.6	-0.5	-0.8	-1007.4	-100.0	-2.0	-1.0	-0.0	-0.0	-0.0	-0.0
2	23.7	0.0	0.1	19.2	5.6	1.6	0.6	15471.0	5.1	14.9	0.3	-23.7	0.0	-0.1	-19.2	-5.6	-1.6	-0.6	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0

Matrix Per Iteration

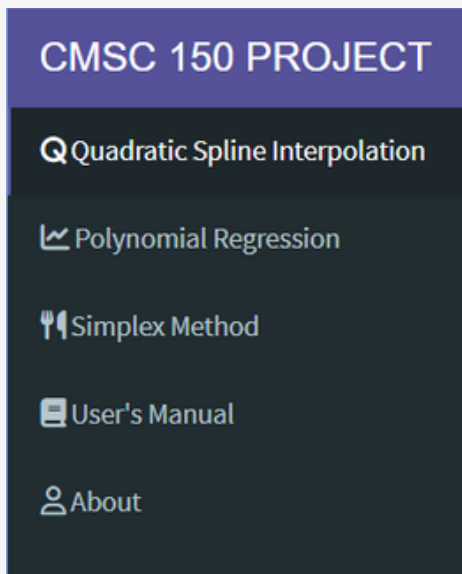
[[1]]

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14
1	6.481e+01	0.0	7.621e-01	6.092e-01	11.476192	7.893e+00	7.772e+00	0	1.583e+02	1.533e+02	2.186e+00	-6.481e+01	0.0	-7.621e-01
2	1.532e+03	0.0	6.464e-06	1.241e-03	0.800362	1.034e-04	3.878e-05	1	3.296e-04	9.631e-04	1.939e-05	-1.532e+03	0.0	-6.464e-06
3	6.318e+00	0.0	9.965e-02	3.473e-01	1.480599	6.945e-01	2.979e-01	0	2.782e+00	1.595e+01	1.990e-01	-6.318e+00	0.0	-9.965e-02

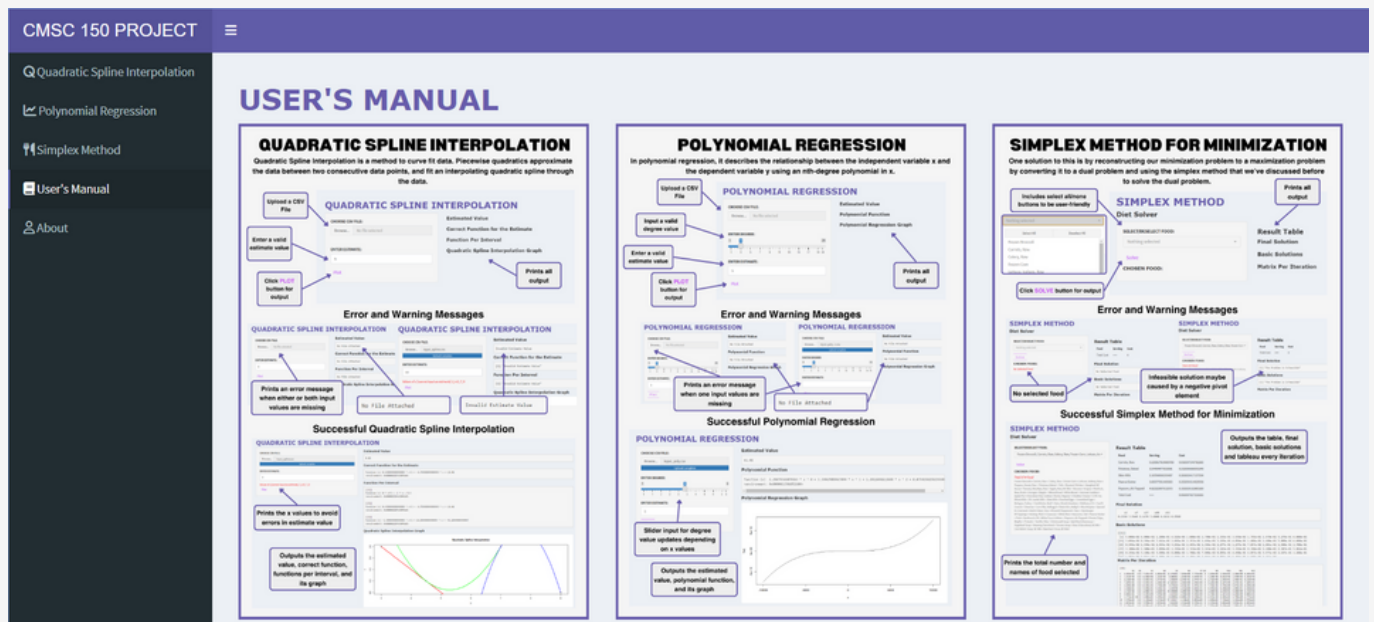
Outputs the table, final solution, basic solutions, the initial tableau, and tableau every iteration

Prints the total number and names of food selected

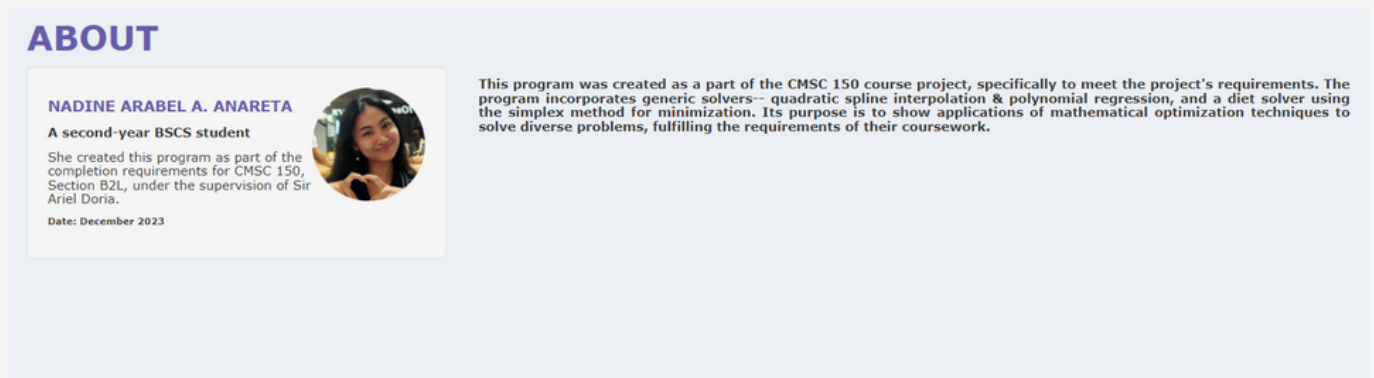
OTHER FEATURES



A sidebar for easy access, the output display can be seen in the body



A copy of the user's manual on the website



Displays about the creator and about the website