USER MANUAL

CMSC 150 FINAL PROJECT

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A B O U T

The application contains generic solvers and a simplex implementation.

The generic solvers are Polynomial Regression and Quadratic Spline Interpolation.

For the Polynomial Regression, it accepts a CSV file, degree of the equation, and a value to estimate. The output for the polynomial regression is the equation generated by the algorithm and its evaluated value.

For the Quadratic Spline, it also accepts a CSV file and value to estimate. It outputs all the equations for each interval and an evaluated value

For the Simplex Implementation, it provides solution for optimizing shipment costs of golf club.

SIMPLEX

Step 1: Input Data

File input

BROWSE... No file selected

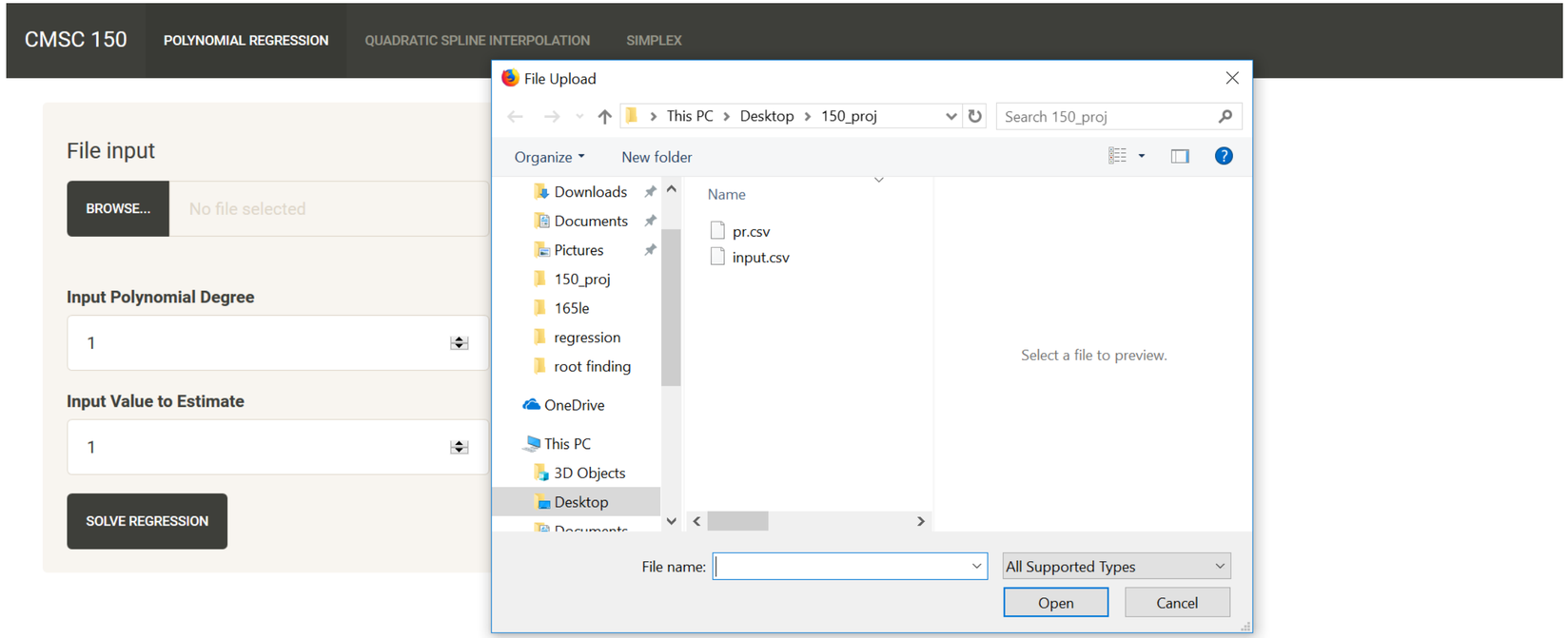
Input Polynomial Degree

1

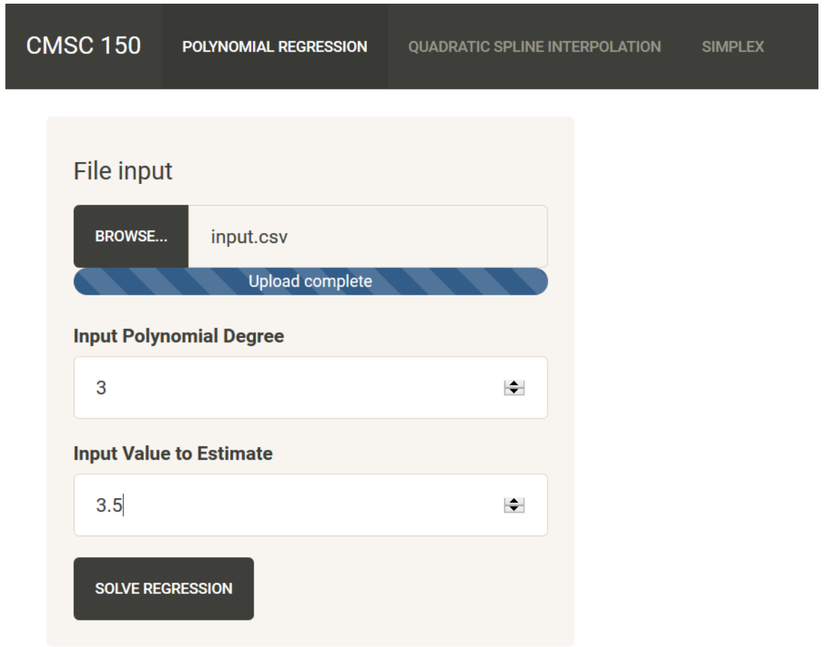
Input Value to Estimate

1

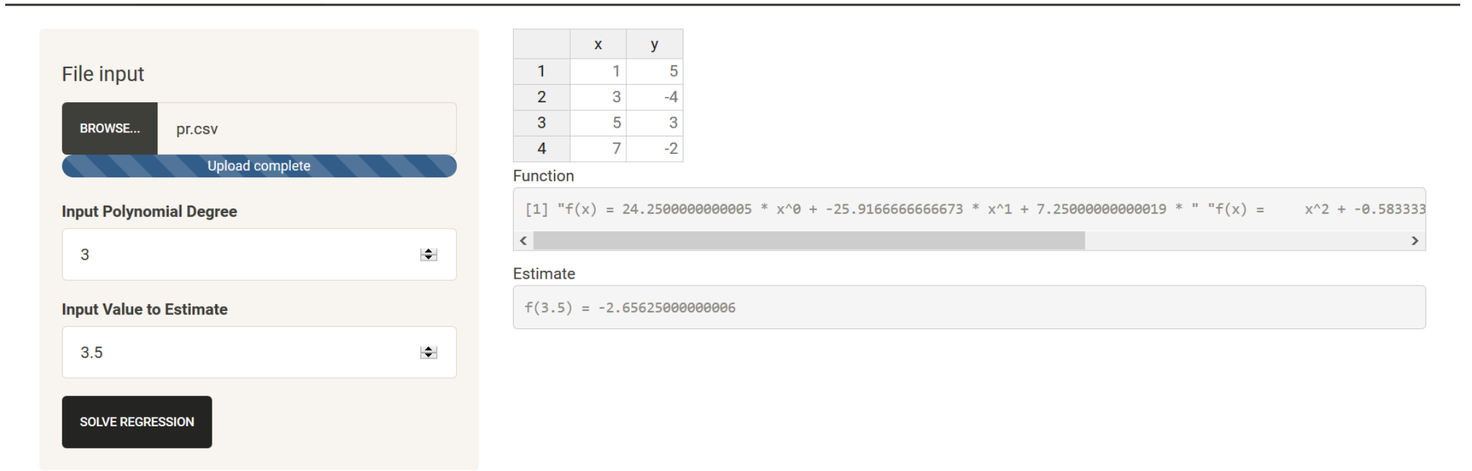
SOLVE REGRESSION



Step 2: Input degree and value to estimate



Step 3: View output



	x	y
1	1	5
2	3	-4
3	5	3
4	7	-2

Function

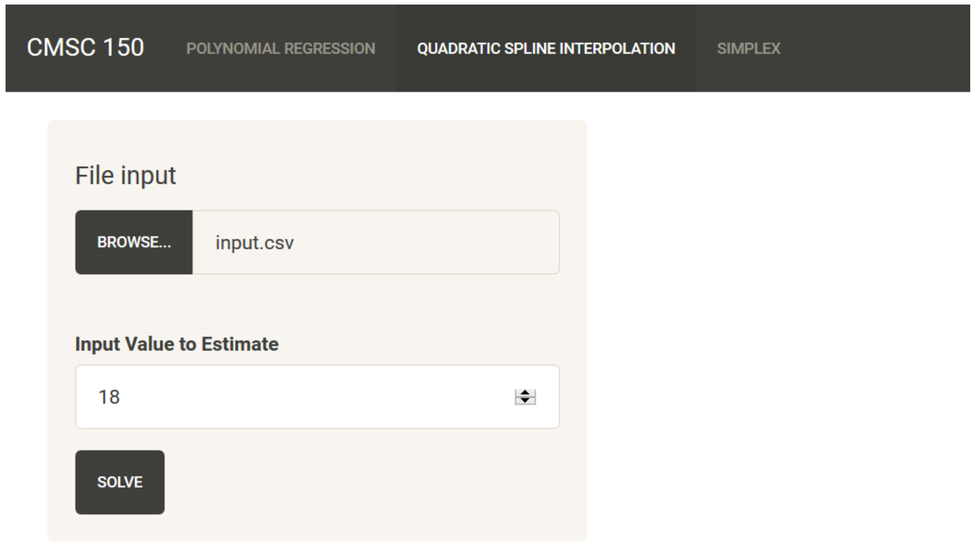
```
[1] "f(x) = 24.2500000000005 * x^0 + -25.9166666666673 * x^1 + 7.25000000000019 * " "f(x) =      x^2 + -0.583333
```

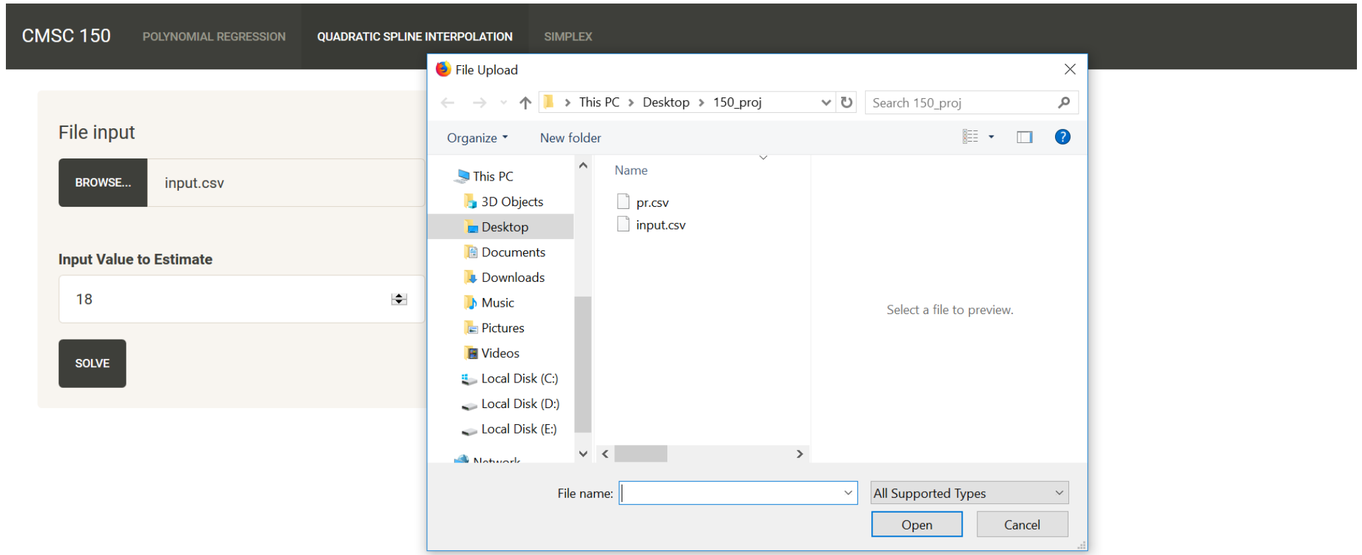
Estimate

```
f(3.5) = -2.65625000000006
```

QUADRATIC SPLINE INTERPOLATION

Step 1: Input Data





Step 2: Input Value to estimate

Step 3: View output

CMSC 150 | POLYNOMIAL REGRESSION | QUADRATIC SPLINE INTERPOLATION | SIMPLEX

File input

BROWSE... input.csv

Upload complete

Input Value to Estimate

18

SOLVE

	x	y
1	0	14.62
2	8	11.84
3	16	9.87
4	24	8.42
5	32	7.31
6	40	6.41

Functions per Interval

```
[1] "function(x) 14.621 * x**0 + 15.426 * x**0 + 11.07 * x**0 + 19.233 * x**0 + 2.83299999999999 * x**0"
[2] "function(x) 14.621 * x**1 + 15.426 * x**1 + 11.07 * x**1 + 19.233 * x**1 + 2.83299999999999 * x**1"
[3] "function(x) 14.621 * x**2 + 15.426 * x**2 + 11.07 * x**2 + 19.233 * x**2 + 2.83299999999999 * x**2"
[4] "function(x) 14.621 * x**3 + 15.426 * x**3 + 11.07 * x**3 + 19.233 * x**3 + 2.83299999999999 * x**3"
[5] "function(x) 14.621 * x**4 + 15.426 * x**4 + 11.07 * x**4 + 19.233 * x**4 + 2.83299999999999 * x**4"
```

Function

```
[1] "function(x) 14.621 * x**2 + 15.426 * x**2 + 11.07 * x**2 + 19.233 * x**2 + 2.83299999999999 * x**2"
```

Estimate

```
[1] 20471.29
```

SIMPLEX IMPLEMENTATION

Fairways Woods Company Shipping Analysis

Number to ship from plant to warehouse

	Total	California	Utah	New.Mexico	Illinois	New.York
Denver	0.00	0.00	0.00	0.00	0.00	0.00
Phoenix	0.00	0.00	0.00	0.00	0.00	0.00
Dallas	0.00	0.00	0.00	0.00	0.00	0.00

	California	Utah	New.Mexico	Illinois	New.York
Demand	0.00	0.00	0.00	0.00	0.00

	Denver	Phoenix	Dallas
Supply	0.00	0.00	0.00

Shipping costs from plant to warehouse

	California	Utah	New.Mexico	Illinois	New.York
Denver	0.00	0.00	0.00	0.00	0.00
Phoenix	0.00	0.00	0.00	0.00	0.00
Dallas	0.00	0.00	0.00	0.00	0.00

	California	Utah	New.Mexico	Illinois	New.York
Total	0.00	0.00	0.00	0.00	0.00

OPTIMIZE

Input iteration number

1

Input iteration number

1

	x1	x2	x3	x4	x5	y1	y2	y3	y4	y5	z1	z2	z3	z4	z5	S1	S2	S3	S4	S5	S6	S7	S8	Z
S1	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S2	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
S4	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
S5	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
S6	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
S7	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
S8	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
Z	10.00	8.00	6.00	5.00	4.00	6.00	5.00	4.00	3.00	6.00	3.00	4.00	5.00	5.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

Legend

Blue boxes are input boxes

Green boxes contains computed values

Yellow box contains the tableau based on iteration number

Optimized button must be clicked to render any changes made to the input boxes