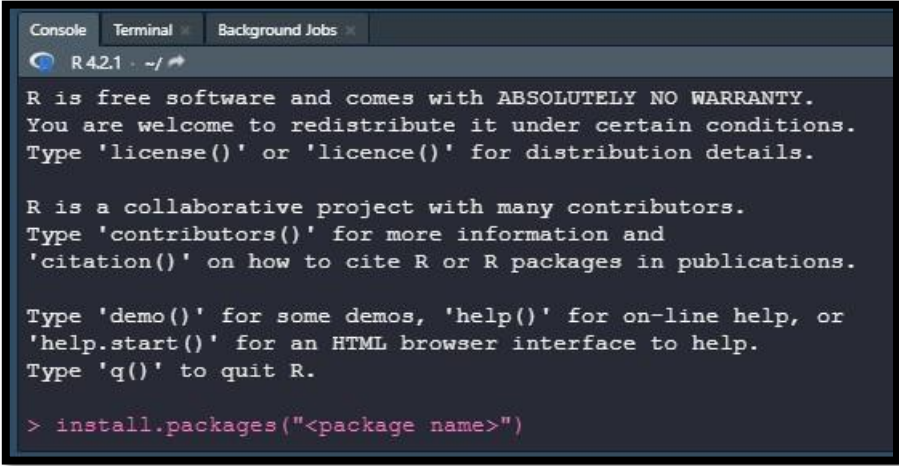


USER MANUAL

R Shiny Application

1. Download YnciertoEx10.zip and extract it. It must have the following files:
 - a. YnciertoEx08.r
 - b. YnciertoEx09.r
 - c. YnciertoEx10.r
 - d. README.txt
2. Open YnciertoEx10.r in R Studio and install the following packages:
 - a. shiny
 - b. shinydashboard
 - c. shinyMatrix
 - d. shinyjs



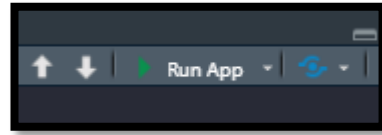
```
R 4.2.1 ~ /  
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.  
  
> install.packages("<package name>")
```

- change the <package name> into the package name you want to install

```
> install.packages("shiny")
```

3. [Optional] Restart your R Studio.

4. Run the Application located in the upper right corner



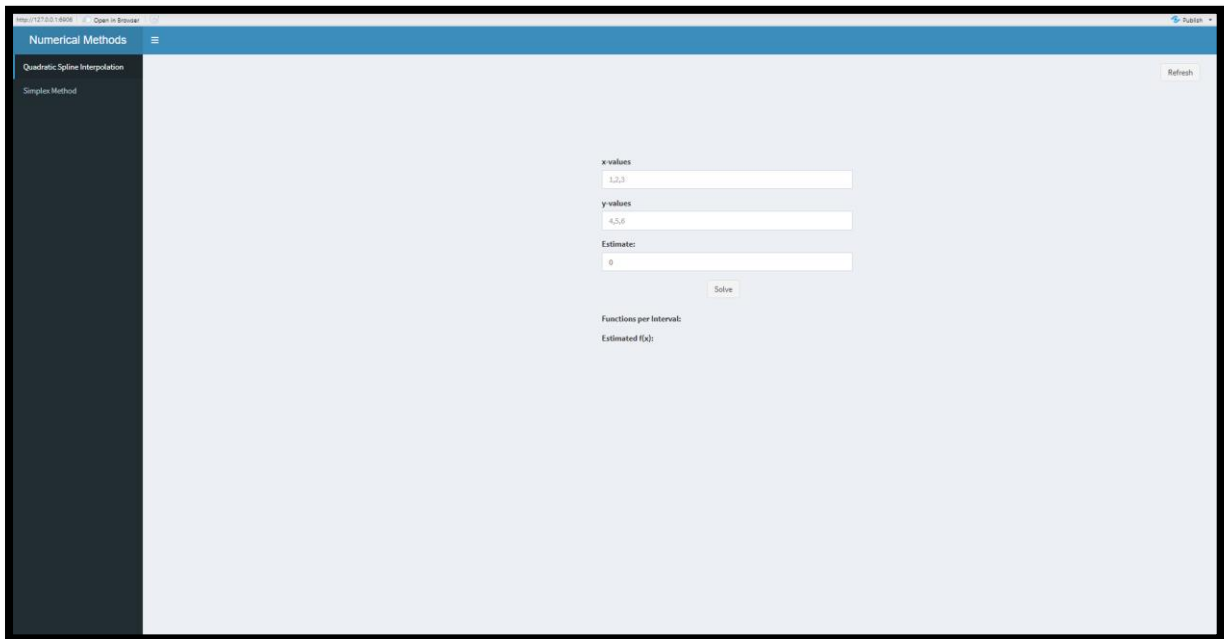
➤ Alternatively, you can use ctrl + alt + r

NOTE:

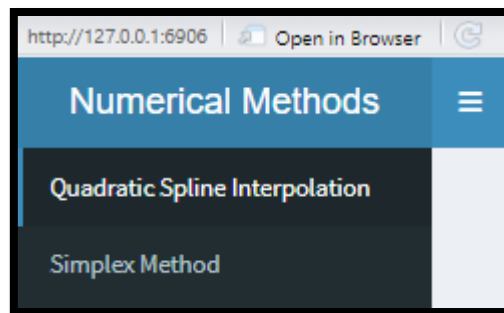
Please maximize the window of the application

=====

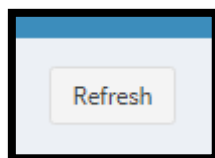
UI Manual



- **Dashboard** for **selecting the numerical method** (default is QSI) located in the upper left corner of the application



- **Refresh button** located in the upper right corner of the application



=====

Quadratic Spline Interpolation Manual

x-values

1,2,3

y-values

4,5,6

Estimate:

0

Solve

Functions per Interval:

Estimated $f(x)$:

- **x-values**
 - x-values of your data points separated by commas
- **y-values**
 - y-values or $f(x)$ of your data points separated by commas
- **Estimate**
 - x value that you want to estimate its $f(x)$
- **Solve**
 - A button you press to perform the method
- **Functions per Interval:**
 - displays the quadratic spline interpolation functions per interval
- **Estimated $f(x)$**
 - displays the estimated value of $f(x)$ based on the x and y-values

=====

Prompts

Estimated $f(x)$:

Please fill the x and y values.

- if x or y values is **empty**

Estimated $f(x)$:

Please fill at least 3 data points.

- if x and y values **did not reach** the **minimum number** of data points

Estimated $f(x)$:

Please fill the same number of data points.

- if number of x and y values are **not equal**

=====

Example of its inputs and result

x-values

y-values

Estimate:

Functions per Interval:

Interval 1:
function(x) $0 * x^2 + -1 * x + 5.5$

Interval 2:
function(x) $0.6399999999999999 * x^2 + -6.759999999999999 * x + 18.46$

Interval 3:
function(x) $-1.5999999999999999 * x^2 + 24.599999999999999 * x + -91.29999999999997$

Estimated f(x):

=====

Simplex Method Manual

Numerical Methods

Simplex Method

Refresh

Method
Minimization

☐ Transportation Problem

Variables: 2 Constraints: 2

Generate

Z:

- **Method**
 - either minimization or maximization
- **Transportation Problem**
 - check if you want to solve a transportation problem
- **Variables**
 - number of variables
- **Constraints**
 - number of constraints
- **Generate**
 - generates a matrix in which you will put the input values
- **Z**
 - will display the minimized or maximized output or the Z in the objective function

■ **Generate button is pressed**

- **if generic problem**

	x1	x2	RHS
Constraint 1	1	2	4
Constraint 2	7	6	20
Objective Function	14	20	0

Solve

- Matrix will appear depending on the x and y values input
- Solve button will appear
- **If transportation problem**

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	RHS
Constraint 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constraint 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Objective Function	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Solve

- matrix will appear with 16 columns and 9 rows including the row of the Objective Function and the column of the RHS
- solve button will appear

- **Solve button is pressed**
 - **if generic problem**

Final Tableau:						
	S1	S2	x1	x2	Z	Solution
x1	0.00	1.00	0.25	-0.12	0.00	1.00
x2	1.00	0.00	-0.75	0.88	0.00	7.00
RHS	0.00	0.00	2.00	1.00	1.00	48.00
Solution Set:						
	S1	S2	x1	x2	Z	Solution
1	-1.14	0.00	2.86	0.00	1.00	40.00
2	0.00	0.00	2.00	1.00	1.00	48.00

- **Final Tableau**
 - displays the final tableau after executing the method
- **Solution Set**
 - displays the solution set every iteration
- **if transportation problem**
 - **Same output** with generic problem **with additional** shipping numbers output

Shipping Numbers:					
	SAC	SL	ALB	CHI	NYC
DEN	20.00	20.00	20.00	20.00	20.00
PHO	0.00	0.00	0.00	0.00	0.00
DAL	0.00	0.00	0.00	0.00	0.00

- displays shipping number of plants to warehouses

=====

Functions

Method

Minimization

Minimization

Maximization

Variables: Constraints:

- can choose between maximization or minimization

Method

Minimization

☒ Transportation Problem

Variables: Constraints:

2 2

Generate

- if transportation problem is checked, it will disable other user input

	x1	x2	RHS
Constraint 1	0	0	0
Constraint 2	0	0	0
Objective Function	0	0	0

Solve

- generates a matrix based on the input when generate button is clicked

Z:

Please fill in the matrix

	x1	x2	RHS
Constraint 1	0	0	0
Constraint 2	0	0	0
Objective Function	0	0	0

Solve

- if the matrix's input is all with the default value

=====

Example of its inputs and result

- **Generic Problem**

Method

Minimization

☐ Transportation Problem

Variables:

2

Constraints:

2

Generate

Z:

48

- Z value is seen when the solve button is clicked

	x1	x2	RHS
Constraint 1	1	2	4
Constraint 2	7	6	20
Objective Function	14	20	0

Solve

- generate a matrix for user input as well as solve button

Final Tableau:						
	S1	S2	x1	x2	Z	Solution
x1	0.00	1.00	0.25	-0.12	0.00	1.00
x2	1.00	0.00	-0.75	0.88	0.00	7.00
RHS	0.00	0.00	2.00	1.00	1.00	48.00

Solution Set:						
	S1	S2	x1	x2	Z	Solution
1	-1.14	0.00	2.86	0.00	1.00	40.00
2	0.00	0.00	2.00	1.00	1.00	48.00

- displays the final tableau as well as the solution set

- Transportation Problem

Method

Minimization

☒ Transportation Problem

Variables:

2

Constraints:

2

Generate

Z:

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	RHS
Constraint 1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	100
Constraint 2	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	100
Constraint 3	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	100
Constraint 4	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	20
Constraint 5	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	20
Constraint 6	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	20
Constraint 7	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	20
Constraint 8	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	20
Objective Function	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0

Solve

- generate a predefined matrix

Final Tableau:

	s1	s2	s3	s4	s5	s6	s7	s8	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	s15	Z	Solution
x1	-1.00	-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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
x2	-1.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
x3	-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	0.00	0.00	0.00	0.00	0.00	0.00	5.00
x4	-1.00	0.00	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	0.00	0.00	0.00	0.00	0.00	5.00
x5	-1.00	0.00	0.00	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	0.00	0.00	0.00	0.00	5.00
x6	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	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
x7	1.00	-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	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
x8	1.00	-1.00	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	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
x9	1.00	-1.00	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	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
x10	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	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
x11	1.00	0.00	-1.00	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	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
x12	1.00	0.00	-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	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
x13	1.00	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	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
x14	1.00	0.00	-1.00	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	0.00	1.00	0.00	0.00	0.00
x15	1.00	0.00	-1.00	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	0.00	1.00	0.00	0.00
RHS	0.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	20.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	500.00

- final tableau

Solution Set:																										
	s1	s2	s3	s4	s5	s6	s7	s8	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	s15	Z	Solution	
1	80.00	100.00	100.00	0.00	-20.00	-20.00	-20.00	-20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	100.00	
2	60.00	100.00	100.00	0.00	0.00	-20.00	-20.00	-20.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	200.00	
3	40.00	100.00	100.00	0.00	0.00	0.00	-20.00	-20.00	20.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	300.00	
4	20.00	100.00	100.00	0.00	0.00	0.00	0.00	-20.00	20.00	20.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	400.00	
5	0.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	20.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	500.00	

- solution set

Shipping Numbers:					
	SAC	SL	ALB	CHI	NYC
DEN	20.00	20.00	20.00	20.00	20.00
PHO	0.00	0.00	0.00	0.00	0.00
DAL	0.00	0.00	0.00	0.00	0.00

- shipping numbers

=====