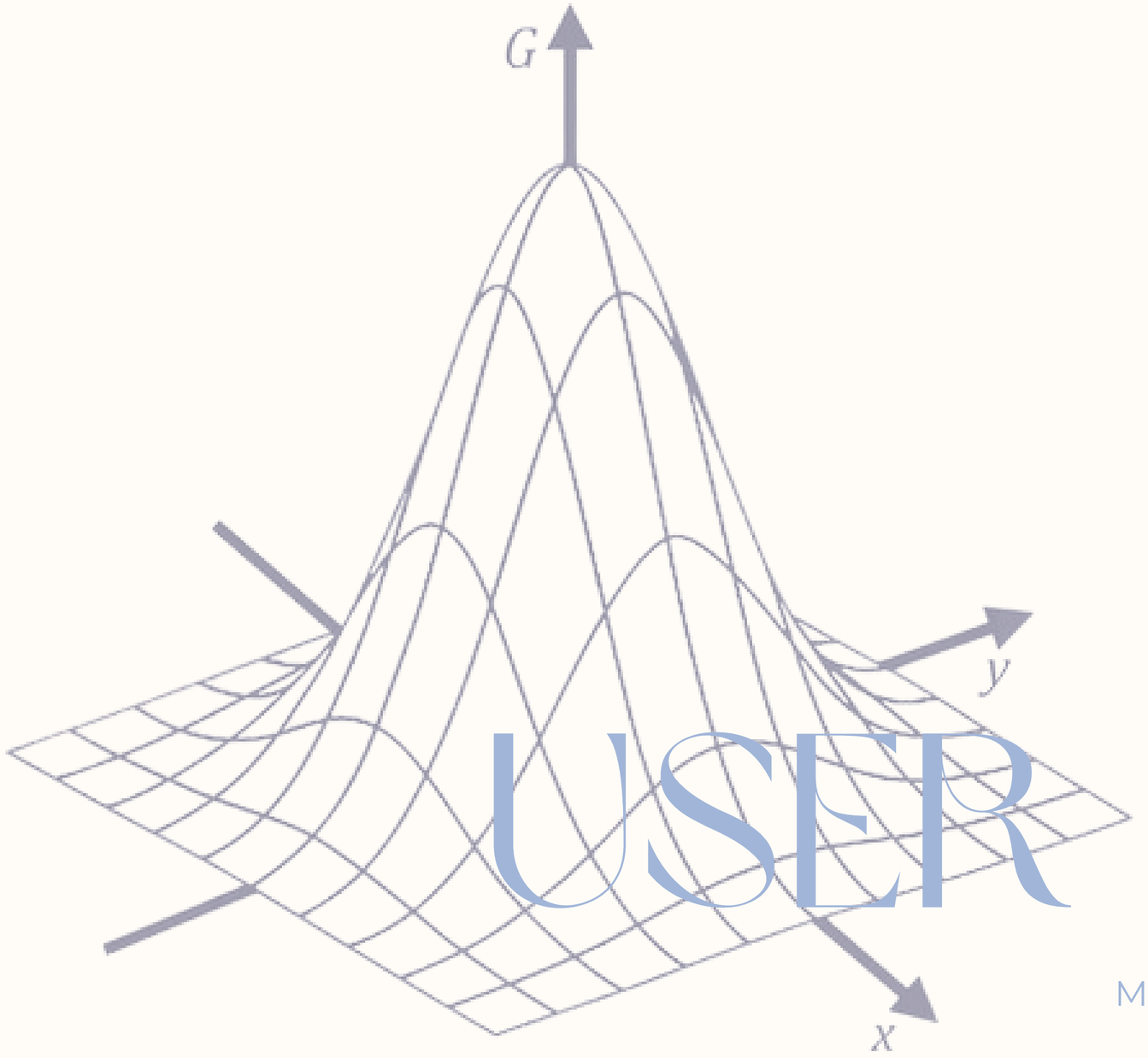


USER MANUAL

MARIE SOPHIA THERESE T. NAKASHIMA

2020-00822
CMSC 150 B-3L

REQUIREMENTS

R and R Studio must be installed in your machine
Download R from CRAN at this link: https://cran.r-project.org/

Download RStudio from the RStudio Website at this link:
https://rstudio.com/products/rstudio/download/

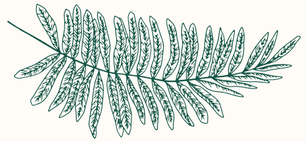
Dependencies

- RShiny
- ShinyDashboard
- RHandsonTable

Installing Dependencies
To install these dependencies, enter these codes in the console of RStudio:

- install.packages("shiny")
- install.packages("shinydashboard")
- install.packages("rhandsontable")

then press ENTER



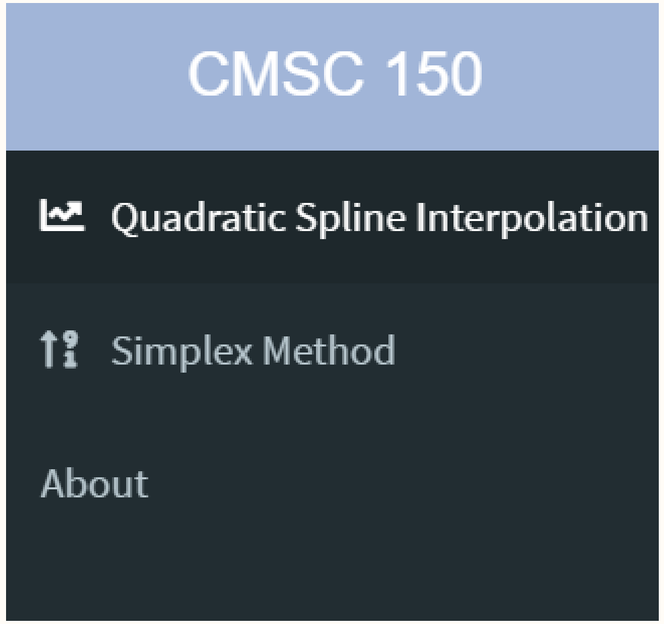
RUNNING THE PROGRAM

Open app.r in RStudio and run the script. Make sure that the working directory is where the R files are.

RUN

QUADRATIC SPLINE INTERPOLATION

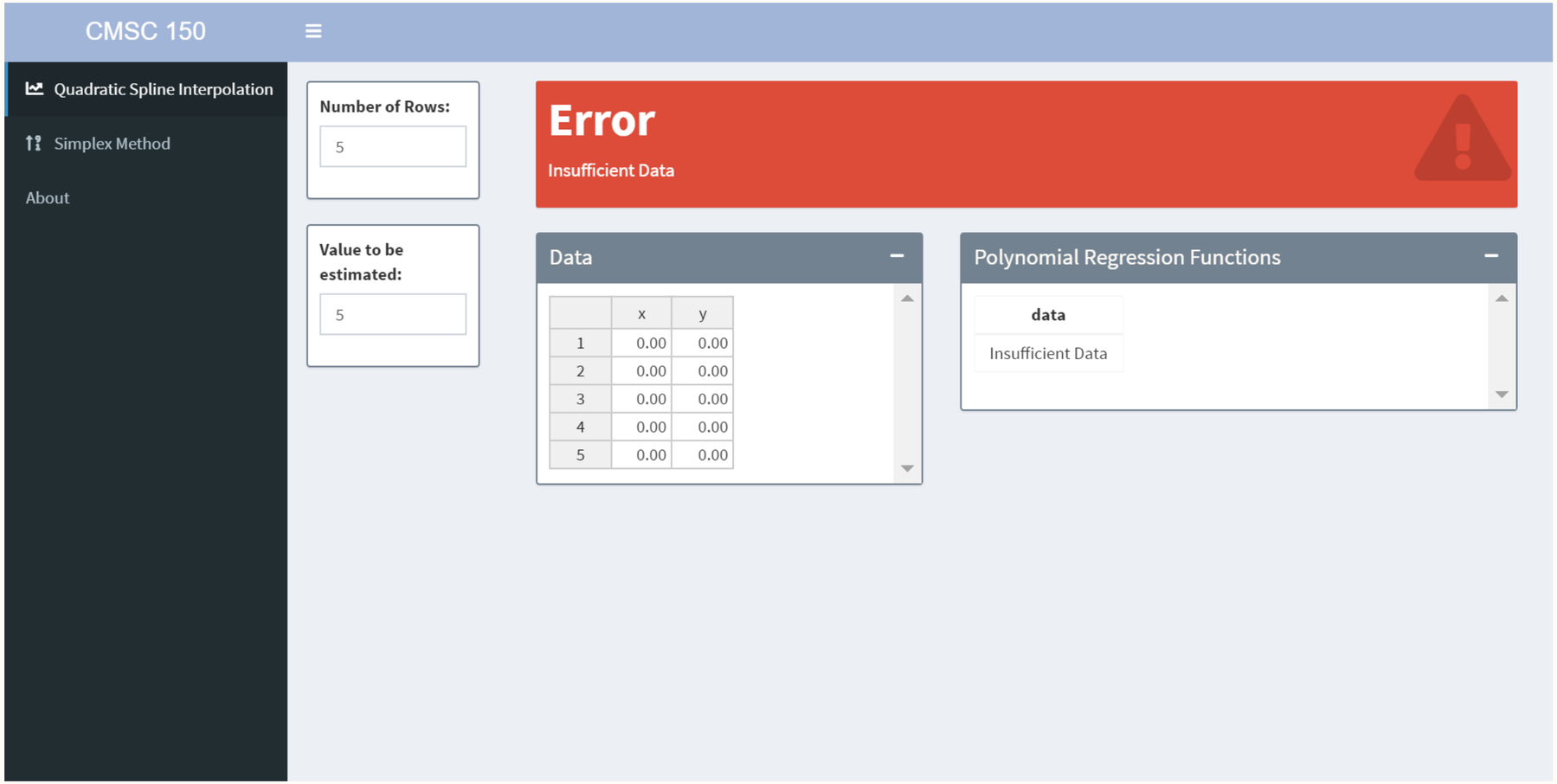
Outputs all the equations for each interval and an estimated value given a set of data

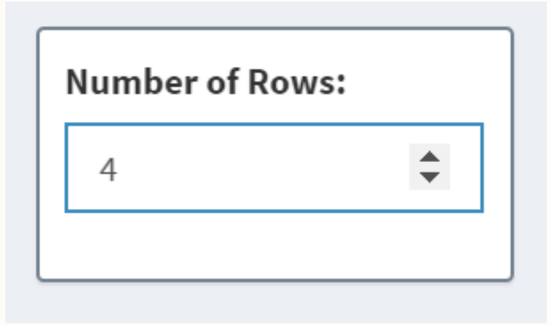


STEP 1:
After running the app, there are 3 main tabs in the collapsible left sidebar. Click the **Quadratic Spline Interpolation** tab

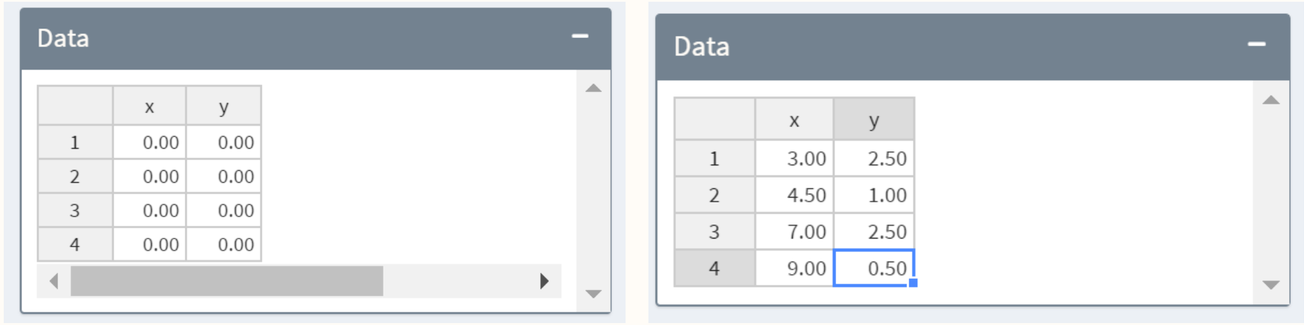
STEP 2:

For reference, you should be redirected to the full page of the Quadratic Spline Interpolation tab





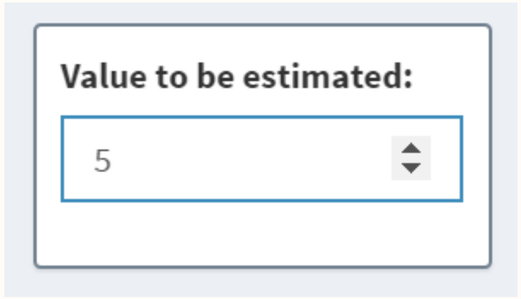
STEP 3:
Input number of rows that the data has then press ENTER



STEP 4:
Input data values

NOTE: Entering characters and symbols in the input table may cause an error

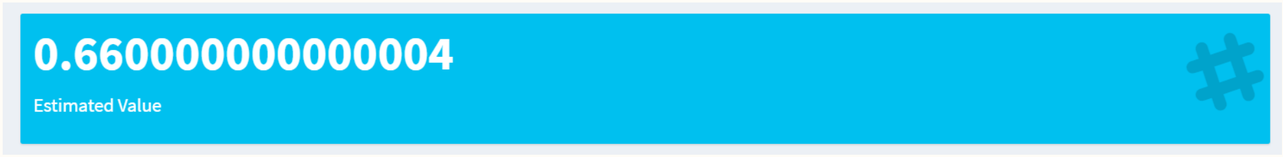
STEP 5:
Input value to be estimated then press ENTER



STEP 7:
Functions per interval will be displayed

Polynomial Regression Functions

Interval	Functions
3 <= x <= 4.5	0 * x^2 + -1 * x + 5.5
4.5 <= x <= 7	0.64 * x^2 + -6.76 * x + 18.46
7 <= x <= 9	-1.6 * x^2 + 24.6 * x + -91.3



STEP 6:
Estimated value will be displayed

SIMPLEX METHOD

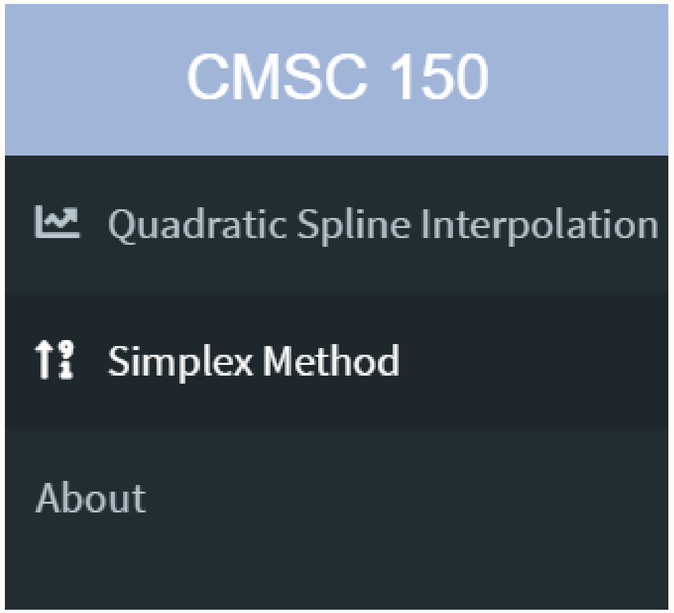
Provides a solution for optimizing shipment costs related to the DIVOC Shipping Analysis problem. Also suitable for finding solutions for generic maximization and minimization problems.

SIMPLEX METHOD

DIVOC SHIPPING ANALYSIS

Minimizes the total shipping cost of Dedmond Integrated Valley Operations Company (DIVOC) from each manufacturing plant to each warehouse.

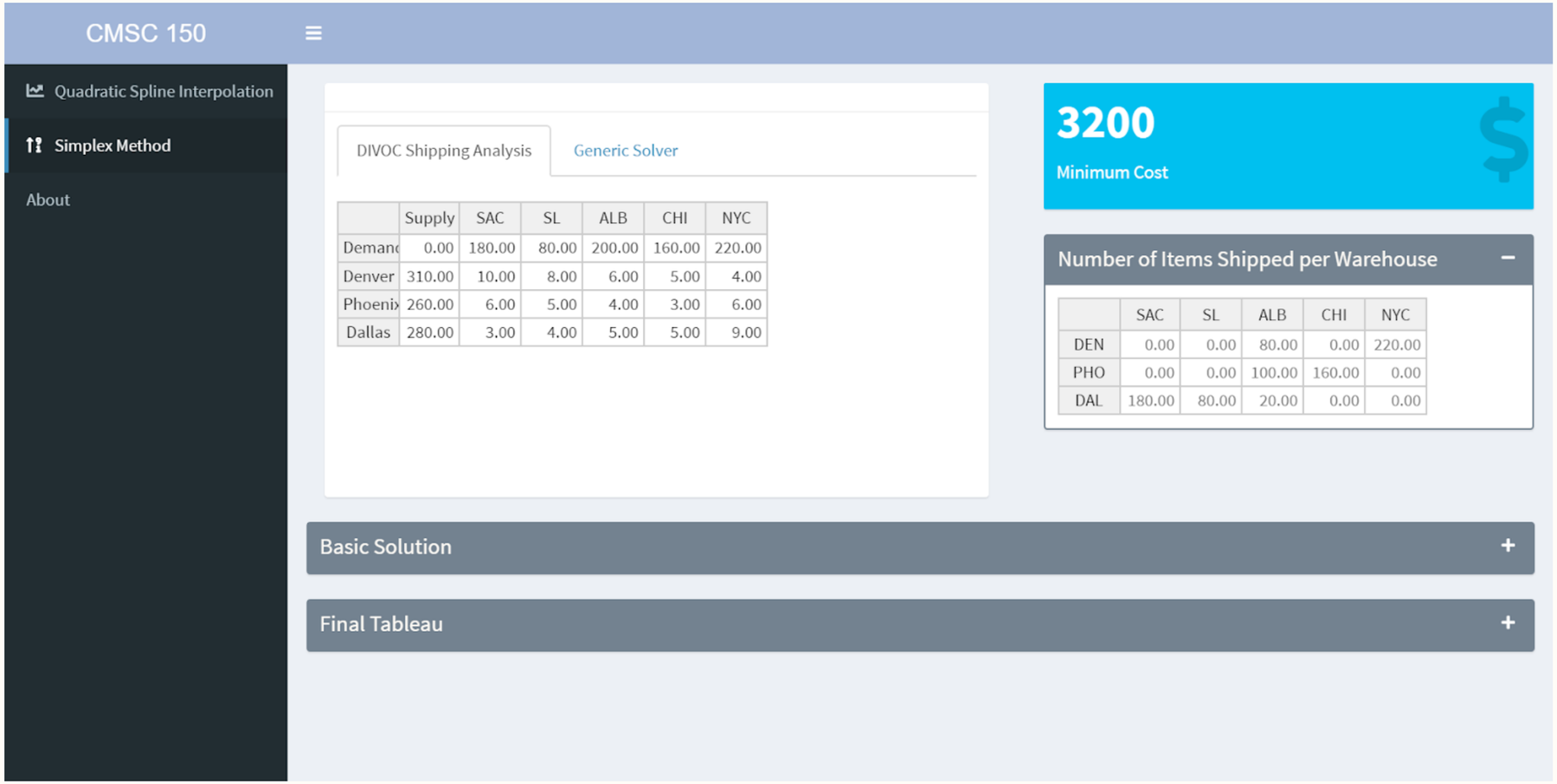
CMSC 150 B-3L



STEP 1:
After running the app, there are 3 main tabs in the collapsible left sidebar. Click the **Simplex Method** tab

STEP 2:

For reference, you should be redirected to the full page of the Simplex Method tab



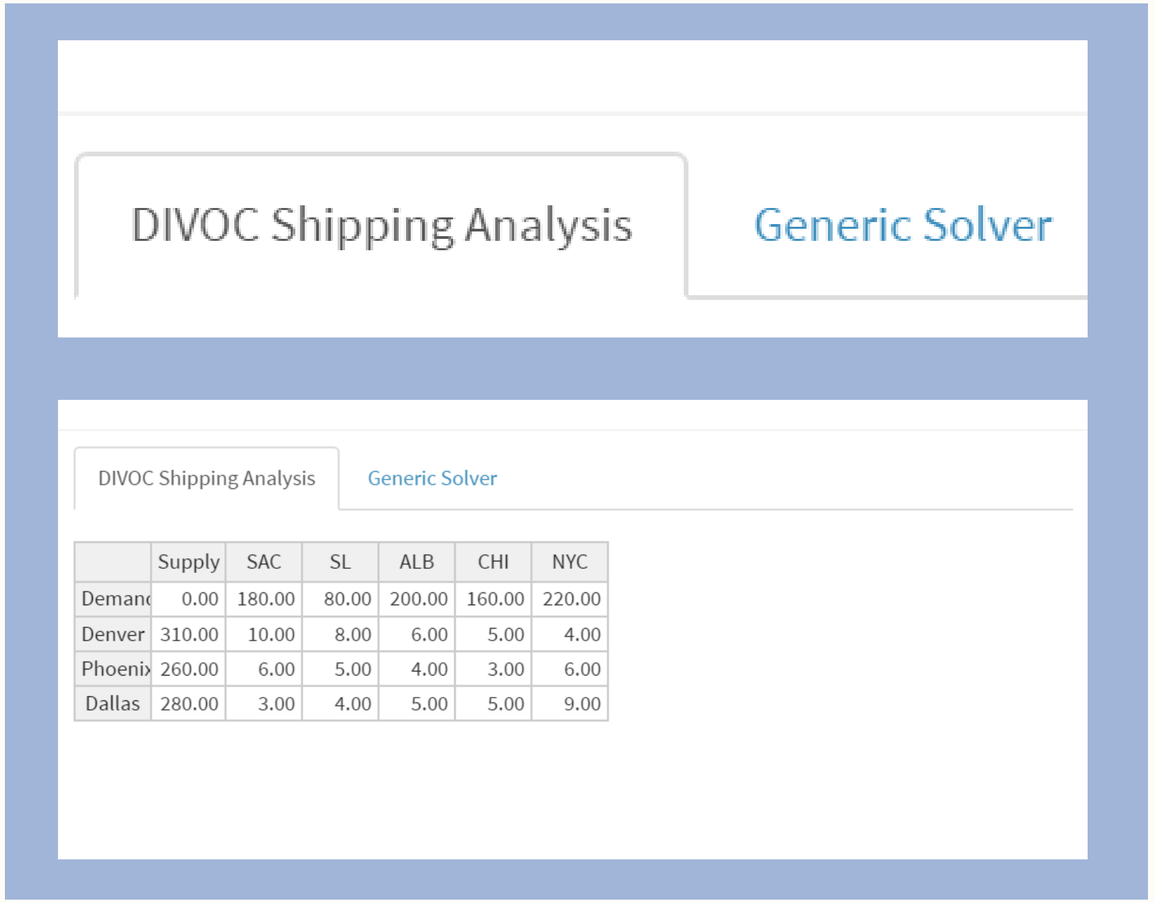
STEP 3:

There are 2 tabs in the box located on the upper left portion of the page. Click the **DIVOC Shipping Analysis** Tab

STEP 4:

Input data values. Initial values can be changed by clicking the cell, typing a value or number, then press ENTER

NOTE: Entering characters and symbols in the input table may cause an error



STEP 5:

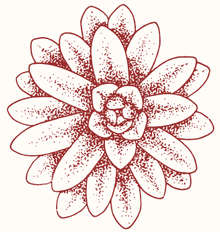
View outputs

- Minimum cost
- Number of items shipped per warehouse
- Basic Solution
- Final Tableau

Minimum Cost

3200

Minimum Cost



Number of Items Shipped per Warehouse

Number of Items Shipped per Warehouse

	SAC	SL	ALB	CHI	NYC
DEN	0.00	0.00	80.00	0.00	220.00
PHO	0.00	0.00	100.00	160.00	0.00
DAL	180.00	80.00	20.00	0.00	0.00

Basic Solution

- Press the "+" button to expand and see the basic solution output

Basic Solution +

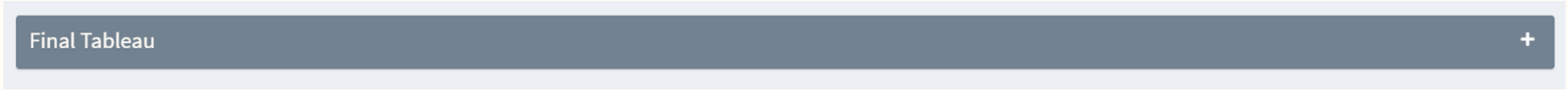
- Scroll horizontally to see other data values

Basic Solution −

S1	S2	S3	S4	S5	S6	S7	S8	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	80.00	0.00	220.00	0.00	0.00	100.00	160.00	0.00	180.00	80.00	20.00	0.00	0.00

Final Tableau

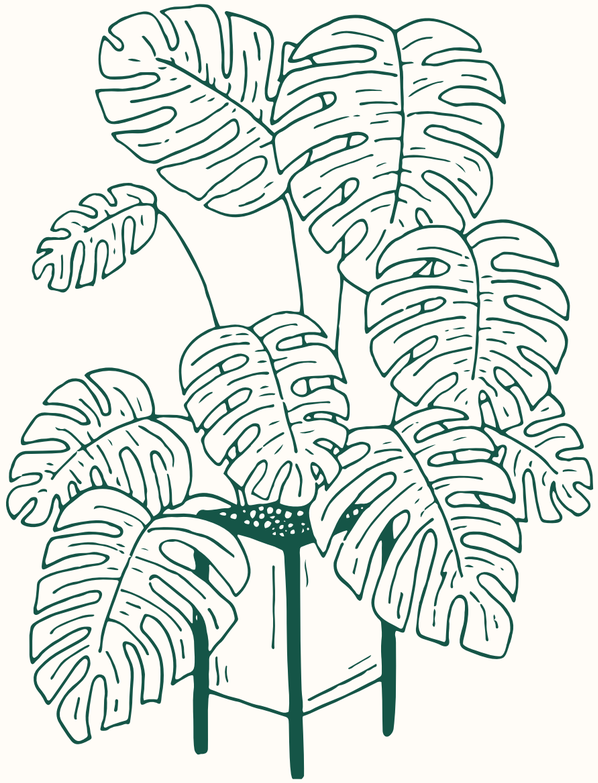
- Press the "+" button to expand and see the final tableau output



- Scroll horizontally to see other data values

Final Tableau −

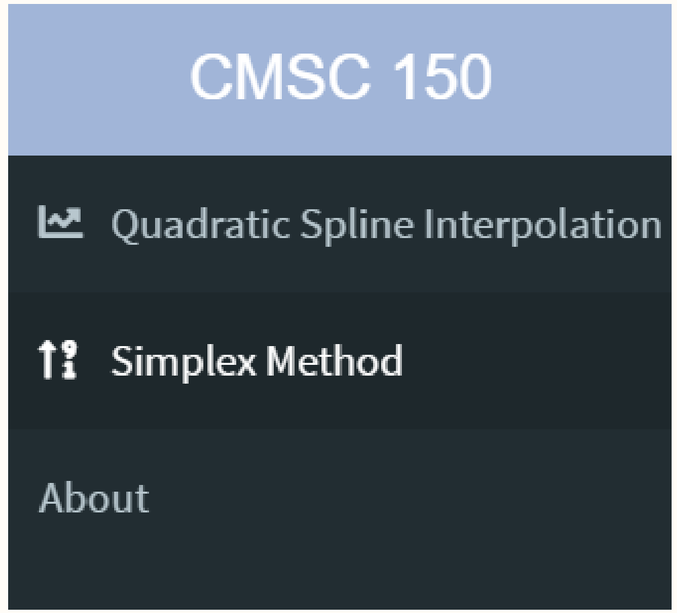
S1	S2	S3	S4	S5	S6	S7	S8	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	0.00	1.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	1.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	-1.00	0.00	1.00	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	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	1.00	0.00	0.00	0.00	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	-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	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	0.00	-1.00	0.00	0.00	-1.00	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	0.00	1.00	-1.00	0.00	0.00	0.00	-1.00	1.00	0.00	0.00
0.00	0.00	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	1.00	0.00	-1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	-1.00	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	0.00	1.00	0.00	-1.00	0.00	0.00	-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	-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	-1.00	0.00	0.00
0.00	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	1.00	-1.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	-1.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	-1.00	0.00	0.00	0.00	-1.00	1.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	0.00	1.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	80.00	0.00	220.00	0.00	0.00	100.00	160.00	0.00	180.00	80.00	20.00	0.00	0.00



GENERIC SOLVER

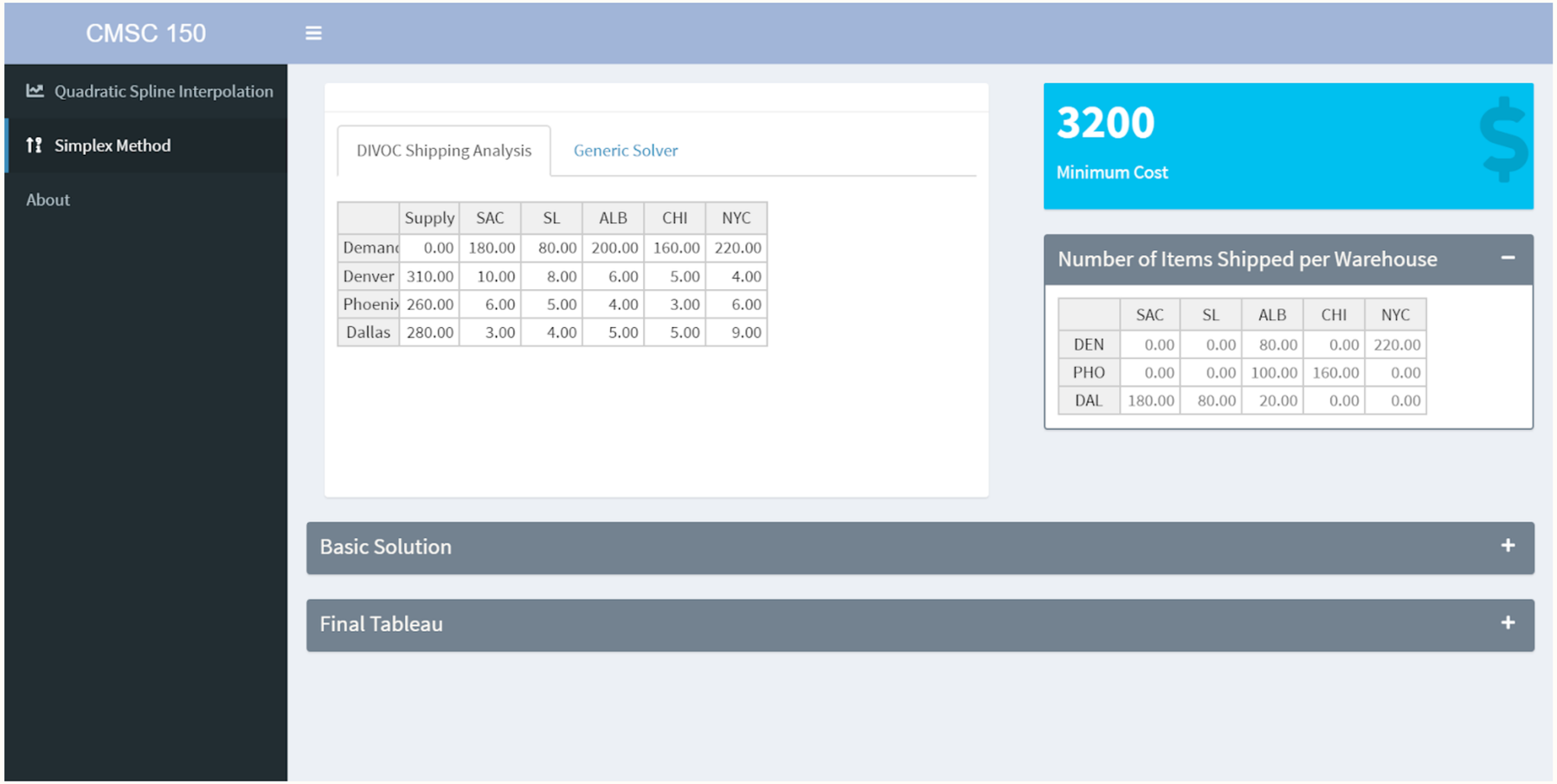
Optimization approach that maximizes profit or minimizes cost given constraints (limited resources) and an objective function.

STEP 1:
After running the app, there are 3 main tabs in the collapsible left sidebar. Click the **Simplex Method** tab



STEP 2:

For reference, you should be redirected to the full page of the Simplex Method tab

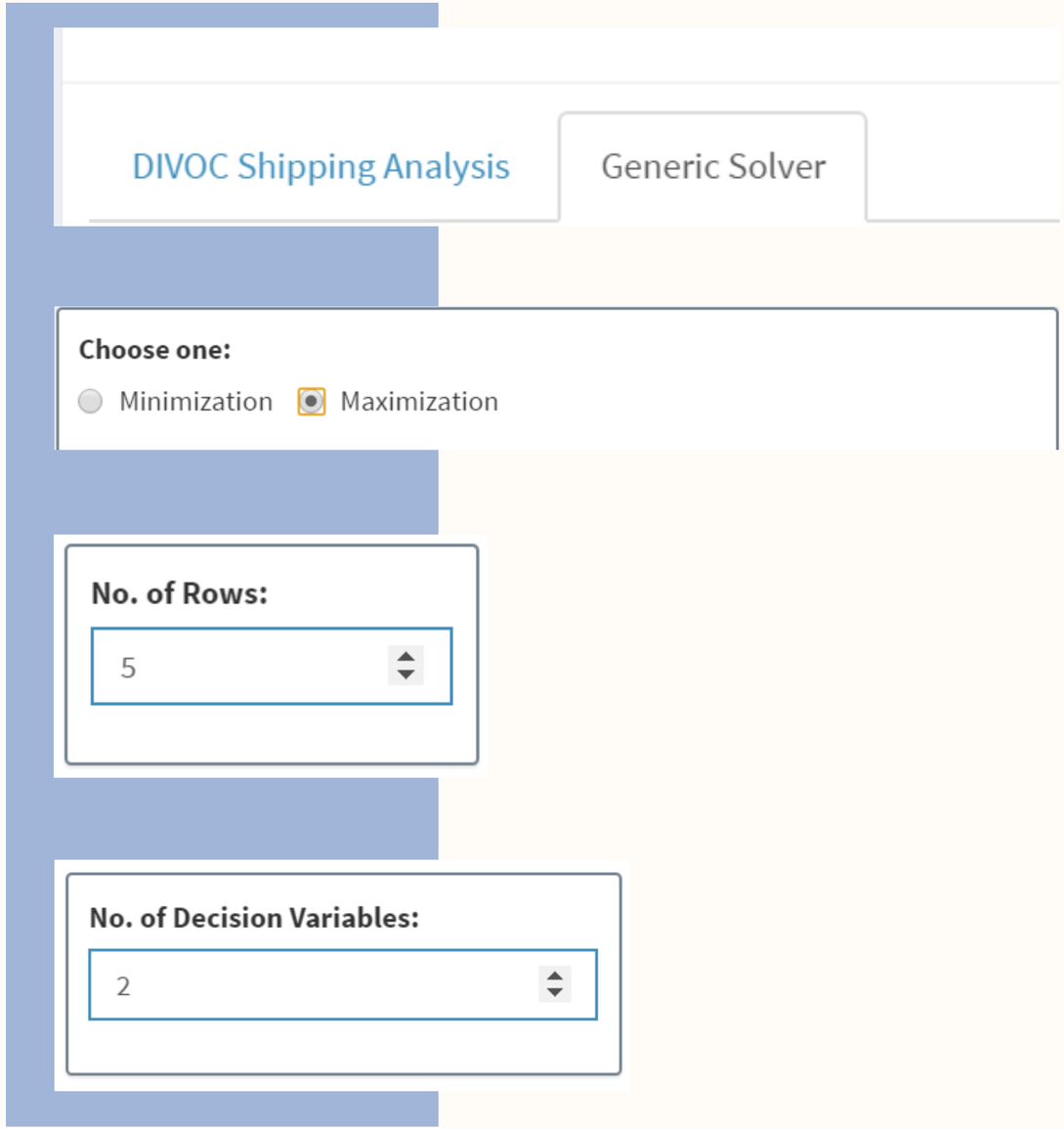


STEP 3:
There are 2 tabs in the box located on the upper left portion of the page. Click the **Generic Solver** Tab

STEP 4:
Choose whether to perform maximization or minimization

STEP 5:
Input number of rows

STEP 6:
Input number of decision variables



STEP 7:

Input initial tableau. Initial values can be changed by clicking the cell, typing a value or number, then press ENTER. The columns for the slack variables already have 1's representing them in their respective rows.

For minimization problems, the initial tableau should already be transposed.

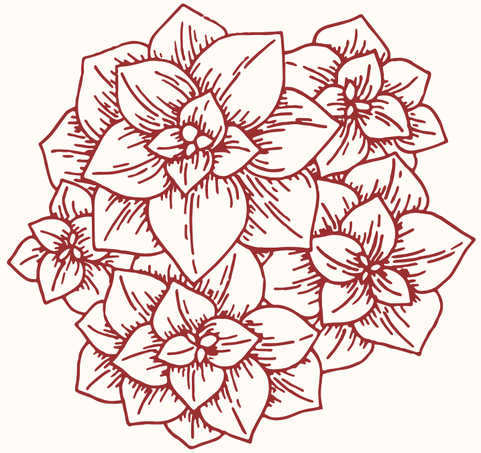
NOTE: Entering characters and symbols in the input table may cause an error

DIVOC Shipping Analysis | Generic Solver

Input initial tableau:

Note: For minimization problems, the matrix from the equations should already be transposed.

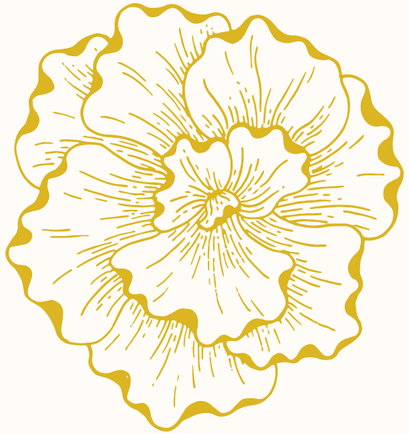
	x1	x2	S1	S2	S3	S4	Z	RHS
1	7.00	11.00	1.00	0.00	0.00	0.00	0.00	77.00
2	10.00	8.00	0.00	1.00	0.00	0.00	0.00	80.00
3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	9.00
4	0.00	1.00	0.00	0.00	0.00	1.00	0.00	6.00
5	-150.00	-175.00	0.00	0.00	0.00	0.00	1.00	0.00



STEP 8:

View outputs

- Minimum/Maximum Value
- Basic Solution
- Final Tableau



Minimum/Maximum Value

1413.88888888889

Maximum Value

Basic Solution

- Press the "+" button to expand and see the basic solution output

Basic Solution +

- Scroll horizontally to see other data values

Basic Solution −

x1	x2	S1	S2	S3	S4	Z
4.89	3.89	0.00	0.00	4.11	2.11	1413.89

Final Tableau

- Press the "+" button to expand and see the final tableau output

Final Tableau +

- Scroll horizontally to see other data values

Final Tableau −

x1	x2	S1	S2	S3	S4	Z	RHS
1.00	0.00	-0.15	0.20	0.00	0.00	0.00	4.89
0.00	0.00	-0.19	0.13	0.00	1.00	0.00	2.11
0.00	0.00	0.15	-0.20	1.00	0.00	0.00	4.11
0.00	1.00	0.19	-0.13	0.00	0.00	0.00	3.89
0.00	0.00	10.19	7.87	0.00	0.00	1.00	1413.89