Inference in Excel QuickStart 2

Use Inputs, Outputs, and Functions in an Inference in Excel Document

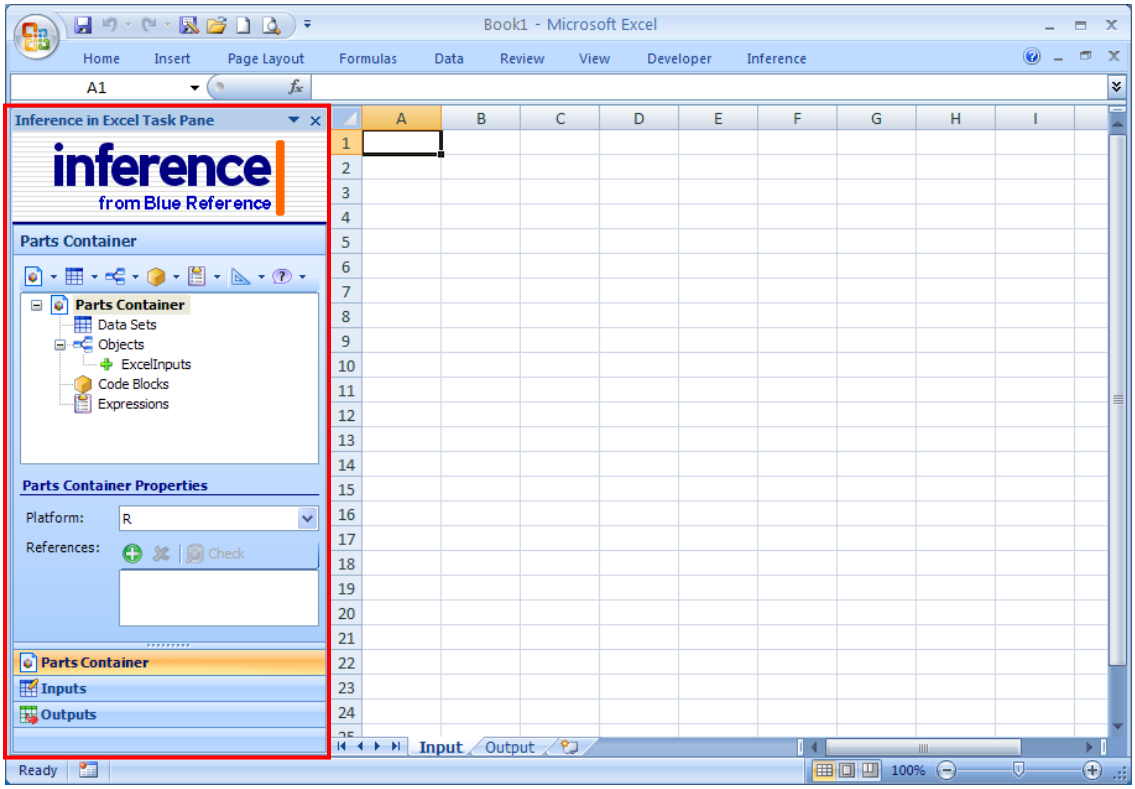
Inference in Excel QuickStart 2 shows you how to:

- Add data and R code to an Inference in Excel document.
- Create and use a custom function within your Inference in Excel document.
- Specify a set of input values for the function.
- Evaluate the function at the values specified and record the results in an Output sheet.
- Use the output values to construct a graph.

1. Add an Inference Parts Container

An Inference in Excel document is a standard Excel document plus an embedded Parts Container. To add a Parts Container to an Excel document:

1. Open or create a new Excel document.
2. In Excel 2007: Click the **Inference** tab on the Excel Ribbon. Click **Add Container**, then select **Add Parts Container**.
   In Excel 2003: On the **Inference** menu, select **Add Parts Container**.
3. The **Inference in Excel Task Pane** will appear:



Note: The **Inference in Excel Task Pane** has 3 sections:

- The **Parts Container** section is used for managing data sets, objects, code blocks and expressions.
- The **Inputs** section manages the mapping between the Excel worksheet "Input" and the object in the Parts Container called "ExcelInput."
- The **Output** section handles the mapping between cells in the Excel worksheet "Output" and the Expressions specified in the Parts Container.

2. Declare a Function

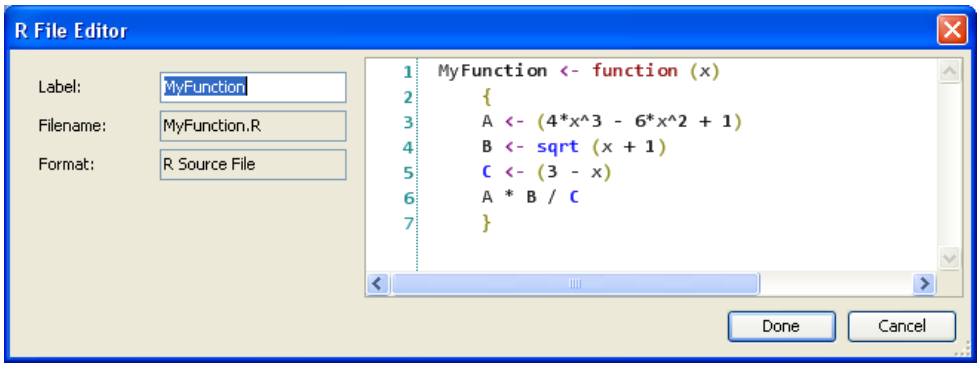
In this example we will declare and use the following custom function:

$$MyFunction\ (x) = \frac{(4x^3 - 6x^2 + 1)\sqrt{x+1}}{3-x}$$

To add MyFunction (x) to your Inference in Excel document:

1. From the **Parts Container** tree, right-click **Objects** and select **Create New Object > R Source File**.
2. Enter **MyFunction** as the file name for the object.
3. In the R File Editor, declare the function by inserting the following R code:

```
MyFunction <- function (x)
      {
      A <- (4*x^3 - 6*x^2 + 1)
      B <- sqrt (x + 1)
      C <- (3 - x)
      A * B / C
      }
```



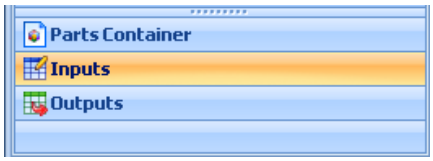
4. Click **Done**.

3. Specify Inputs

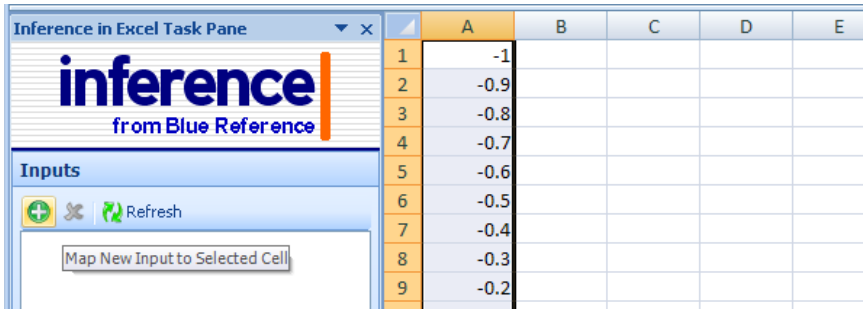
Inference in Excel stores input values in the Excel worksheet labeled **Input** and maps these input values to variables in the scripting platform. To identify the location of the input values, Inference uses Excel Range Names.

To specify inputs:

1. Add some data to the Input sheet in the following manner:
   - Add values -1.0, -0.9, and -0.8 to cells A1, A2 and A3, respectively.
   - Select the three values; select the bottom right corner of the selection; and extend the selection (AutoFill) to cell A21 (value 1.0) for a total of 21 entries.
2. Select the cells (A1 through A21) containing the data.
3. Select the **Inputs** section of the Inference in Excel Task Pane.

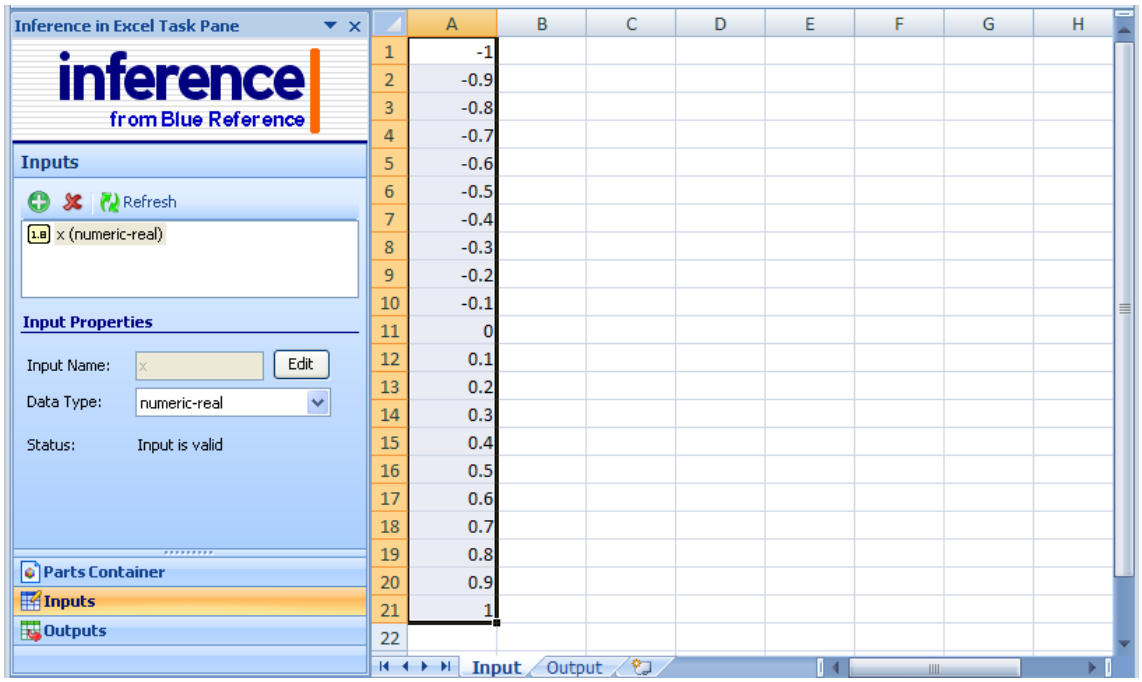


4. On the **Inputs** toolbar, click the **Map New Input to Selected Cell** button.



5. For this example, in the **Enter Input Name** dialog box, enter *x*. The name can include any string composed of letters, numbers and underscores.
6. On the Task Pane, notice that Inference automatically assigns a data type to the range. If necessary, under **Input Properties** select the **numeric-real** data type.
7. If you make any changes to the properties of the variable, you may need to refresh the Task Pane. Notice that when you select the variable name on the Task Pane, the corresponding

range of the Input Sheet will automatically be selected.



4. Specify Output Locations

When the Inference in Excel document is executed, each Expression is calculated. The results are collected in the results document's Output sheet. As with Inputs, Inference uses Excel Range Names to specify where on the Output sheet an expression's output will be placed.

1. Select the cell in the **Output** sheet where you want the results of the Expression calculation to be placed. For this example, select cell A1. This cell will become the first Output value in a column vector, the first Output value in a row vector, or the upper-left corner of an Output matrix.
2. Select the **Outputs** section of the Task Pane.
3. On the Outputs toolbar, click the **Add Expression Output to Selected Cell** button.
4. In the dialog box enter **evaluationResults** as the Output Name. Inference automatically creates a new expression with the same label.

NOTE: If you make any subsequent changes to the Expression, you may need to refresh the Task Pane. Also note that selecting the Expression label on the Task Pane triggers the selection of the corresponding placeholder cell on the **Output** sheet.

5. Specify Output Expressions

1. In the Ouput section of the task pane, double-click **evaluationResults** to open the Expression editor.

2. In the **Expression Editor** enter the following Expression in the **Edit Code Text** box:

```
infOutput.printListAsColumn(MyFunction(x))
```

   In this statement, infOutput.printListAsColumn will print the list that results from calling MyFunction with the input *x* defined earlier.

3. Click **Done**.

When the document is executed (in step 7), Inference will evaluate this expression and record the results in the Output worksheet of the results document.

6. Use Input Data to Create a Graph in Inference in Excel

In Inference in Excel, R instructions in code blocks are used for:

- Instantiating the objects needed to perform calculations and analyses.
- Defining custom functions which are executed as Output Expressions.
- Specifying the textual output to be generated. Textual output will be placed in a separate sheet when the Inference in Excel document is executed.
- Specifying the graphical output to be created. Graphical output will also be placed in a separate sheet when the document is executed.

For example, to create a code block for plotting the values of x against the values of MyFunction evaluated at each x:

1. Select the **Parts Container** section of the Task Pane.
2. In the Manage Parts Container tree, right-click **Code Blocks** and select **Insert and Edit New Code Block**.
3. Enter the following R instruction:

```
plot(
      MyFunction(x) ~ x,
      type="b"
      )
```

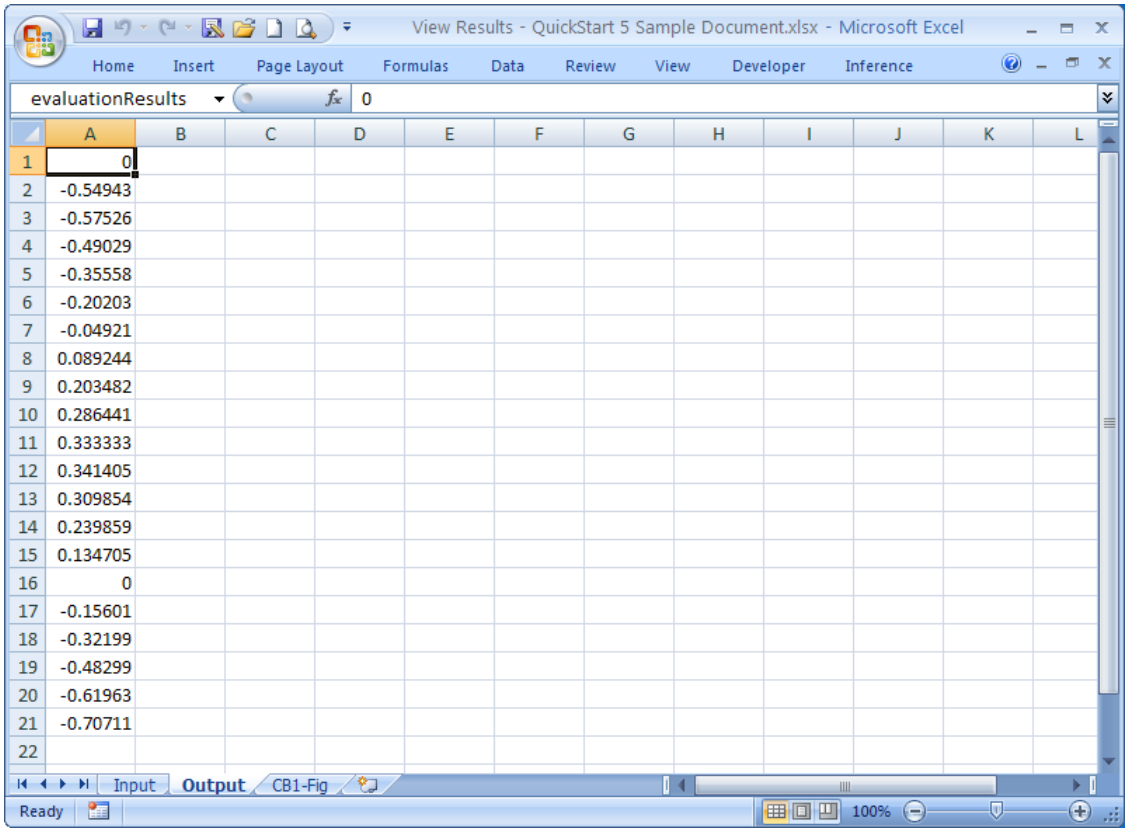
4. Click **Done**

7. View the Results Document

1. Save the document.
2. In Excel 2007: Click the **Inference** tab on the Excel Ribbon.
   In Excel 2003: Click the **Execute Document** button at the bottom of the Inference in Excel Task Pane.

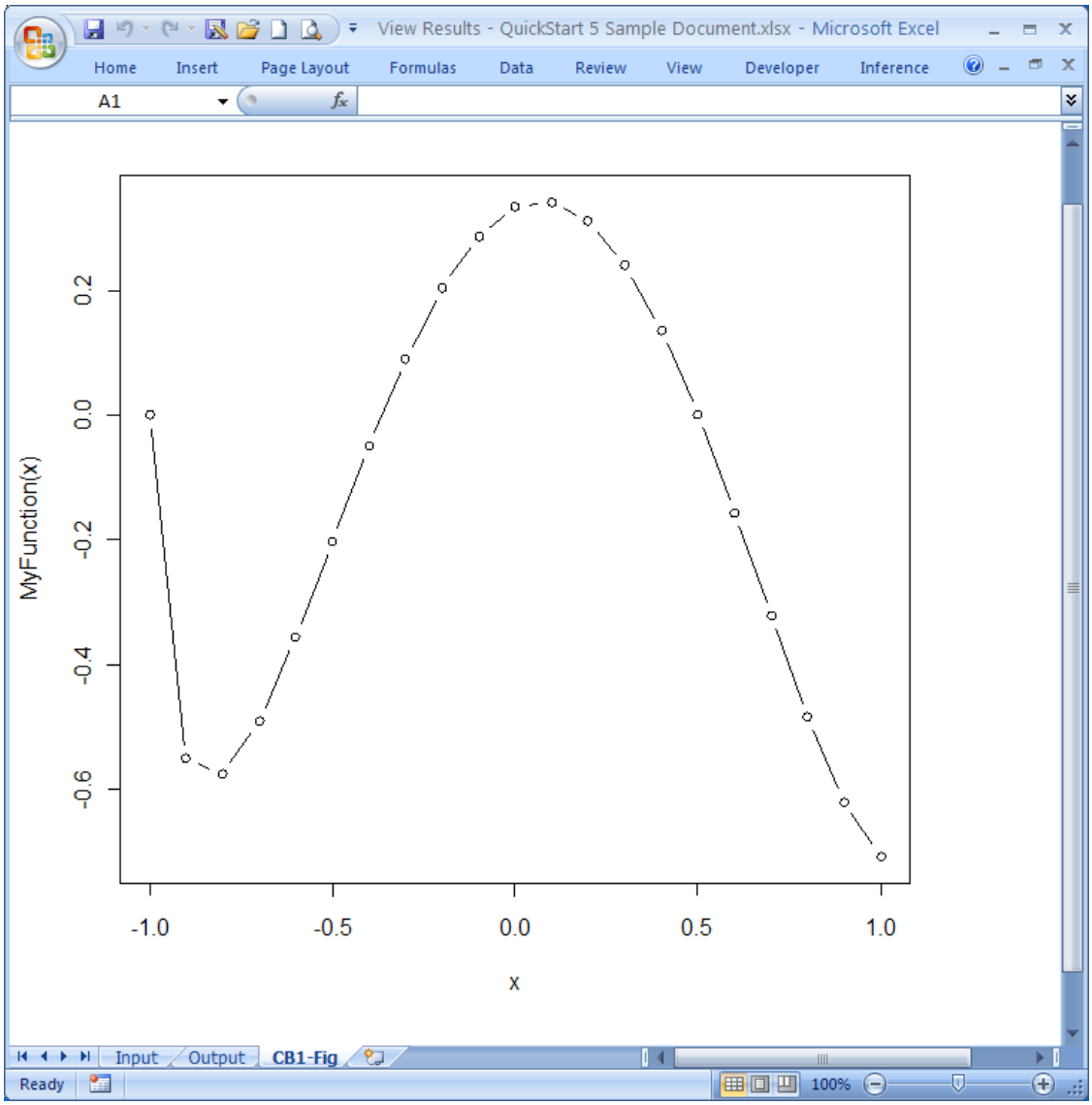
3. To view the results as a Microsoft Excel document, select **To Results Document View > Microsoft Excel View**.

4. Note that the results document contains an Output sheet with the results of evaluating **MyFunction** at each value of x specified in the Input sheet:



	A
1	0
2	-0.54943
3	-0.57526
4	-0.49029
5	-0.35558
6	-0.20203
7	-0.04921
8	0.089244
9	0.203482
10	0.286441
11	0.333333
12	0.341405
13	0.309854
14	0.239859
15	0.134705
16	0
17	-0.15601
18	-0.32199
19	-0.48299
20	-0.61963
21	-0.70711
22	

Also notice that the results document contains a sheet, labeled CB1-Fig, with the plot of x against MyFunction (x):


View Results - QuickStart 5 Sample Document.xlsx - Microsoft Excel
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-0.5
0.0
0.5
1.0
x
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CB1-Fig
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100%