

Excel 2007 Data Tables

(by Dr. Tomas Co 5/7/2008)

Definition:

Data tables are calculations of functions of two variables.

Example:

Suppose we want to evaluate the function

$$f(x, y) = e^{-3(x^2 + y^2)} \quad (1)$$
$$x = -1, -0.9, \dots, 1 \quad \text{and} \quad y = -1, -0.9, \dots, 0$$

Then data tables offer a more efficient way to evaluate this function.

Procedure:

1. Set up the function $f(x, y)$ referencing the cells corresponding to each independent variable.

	A	B	C	D	E
1					
2					
3		x	0		
4		y	0		
5		f(x,y)	1		
6					

Figure 1. Set up 2-variable function for equation (1).

2. Prepare the range of values for each independent variable, e.g. a column of x values and a row of y values (include labels for the y -series if desired). Then link the corner cell with to the cell attached to $f(x, y)$.

	A	B	C	D	E	J	K	L	M
1									
2									
3		x	0						
4		y	0						
5		f(x,y)	1						
6									
7	Labels		y=-1	y=-0.9	y=-0.8	y=-0.3	y=-0.2	y=-0.1	y=0
8		1	-1	-0.9	-0.8	-0.3	-0.2	-0.1	0
9		-1							
10		-0.9							
11		-0.8							
12		-0.7							
27		0.8							
28		0.9							
29		1							
30									

Figure 2. Set up: x values, y values and table evaluation cell.

3. Evaluate the data table

- First, select the range of the data table. (Shortcut tip: select the corner cell **B8**. Then press **[CTRL Shift →]** followed by **[CTRL Shift ↓]**)
- Select the **[Data]→[What-If Analysis]→[Data Table...]** menu item, then link the row and column cells as shown in Figure 3.

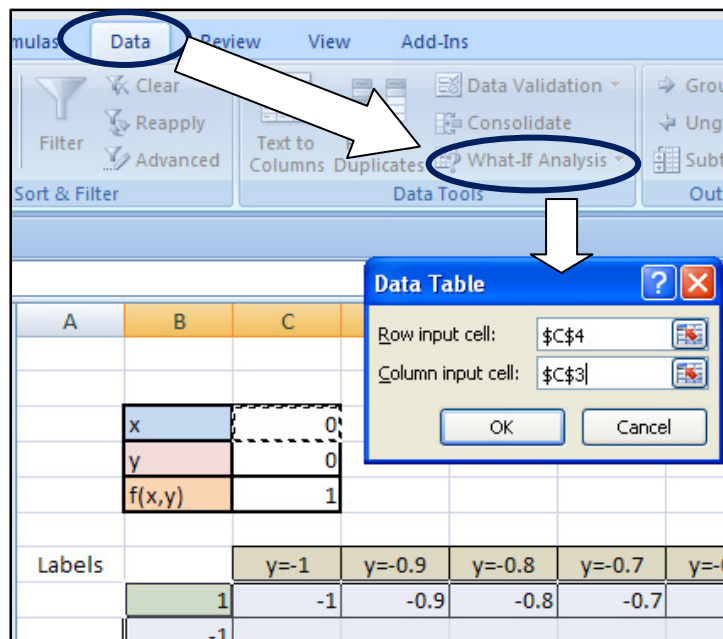


Figure 3. Implementing data table calculations.

4. Plot the results

- First hide the column of y -values. (For the example given, select row 8 then **[Right_Click]** $\rightarrow$ **[Hide]**.)
- Select the range. (Select cell B7 then press **[CTRL Shift $\rightarrow$]** twice followed by **[CTRL Shift $\downarrow$]** twice.)
- Select **[Insert] $\rightarrow$ [Scatter Chart] $\rightarrow$ [Scatter with Straight Lines]**. (Note: you need to resize the plot area to gather all the legend titles.)

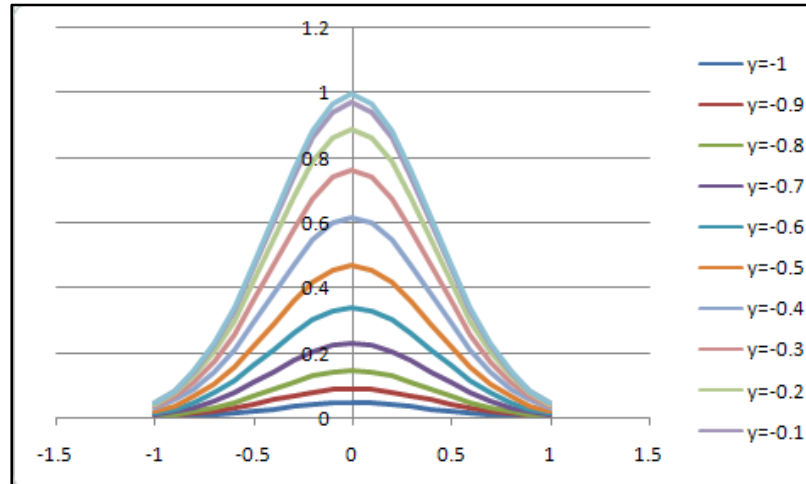


Figure 4. Multiple plots with y values as parameters.

- For a three dimensional surface plot,
 - Repeat steps a) and b) above.
 - Select **[Inset] $\rightarrow$ [Other Charts] $\rightarrow$ [3D Surface]**.

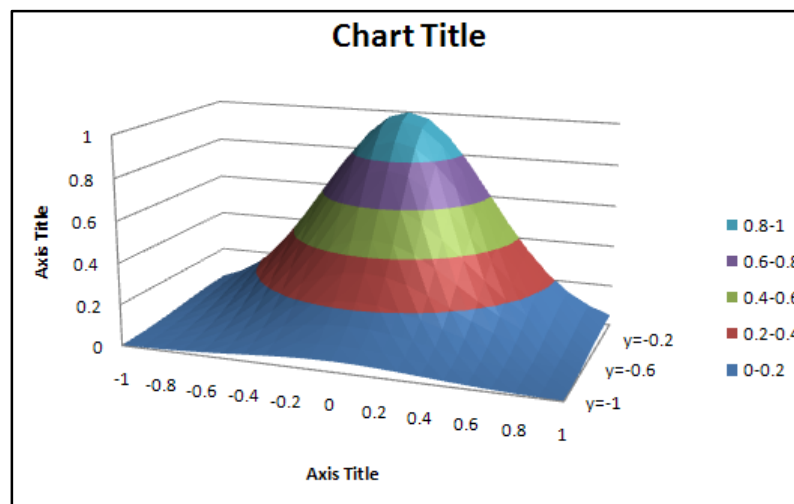


Figure 5. 3D surface plot of the function.