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

\[ f(x, y) = e^{-3(x^2+y^2)} \]  

\[ x = -1, -0.9, ..., 1 \quad \text{and} \quad y = -1, -0.9, ..., 0 \]

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.

   ![Figure 1. Set up 2-variable function for equation (1).](image)

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 \( f(x, y) \).
Figure 2. Set up: $x$ values, $y$ values and table evaluation cell.

3. Evaluate the data table
   a. First, select the range of the data table. (Shortcut tip: select the corner cell B8. Then press [CTRL Shift →] followed by [CTRL Shift ↓])
   b. 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.](image-url)
4. Plot the results

a) First hide the column of $y$-values. (For the example given, select row 8 then [Right_Click] $\rightarrow$ [Hide].)

b) Select the range. (Select cell B7 then press [CTRL Shift $\rightarrow$] twice followed by [CTRL Shift $\downarrow$] twice.)

c) 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.

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

Figure 5. 3D surface plot of the function.