


## Instructions for creating Visual BASIC for Application (VBA) Macros in Excel 2007

1. If the Developer tab is not available, do the following to display it:

- i) Click the Microsoft Office Button ,  and then click Excel Options.
- ii) In the Popular category, under Top options for working with Excel, select the Show Developer tab in the Ribbon check box, and then click OK.

2. To set the security level temporarily to enable all macros, do the following:

- i) On the Developer tab, in the Code group, click Macro Security.
- ii) Under **Macro Settings**, click **Enable all macros (not recommended, potentially dangerous code can run)**, and then click **OK**. (To help prevent potentially dangerous code from running, it is recommended that you return to any one of the settings that disable all macros after you finish working with macros.)



3. On the **Developer** tab, in the **Code** group, click **Macros**.

4. Type in a name for the Macro and click Create.


5. A Modules will be created that has a first line: Sub Name(), and a last line: End Sub.

6. Between these lines, type VBA code.

6. To run the macro from the module window, press Run, Run Sub/UserForm

7. When you run a Macro and get an error, you will need to press Run, Reset.

8. Notice that the Start Bar will have tabs for Excel and for the Macro, so that you can toggle between them.

9. To run a Macro from a worksheet, add a button to the worksheet. On the **Developer** tab, in the **Controls** group, click on Insert, and then on the button . Immediately click on the worksheet where you want to place the control button. A window will open for you to assign a Macro to the button. Each time the button is clicked, the Macro will run.

10. When you save and exit the spreadsheet, the associated Macros are saved.

11. The next time you open the spreadsheet, you can immediately run the macro from the button, or edit the macro by clicking on the **Visual Basic** icon of the **Code** group on the **Developer** Tab.



To learn some basic programming code, Download the Excel file: Introduction to VBA.xls from the class webpage: <http://cobweb.ecn.purdue.edu/~jafvert/ce 559/ce559.html>

CE 55900 - Water Quality Modeling  
 Example Euler Method for First-Order Decay  
 C.T. Jafvert

Run Macro

Kinetic Constants

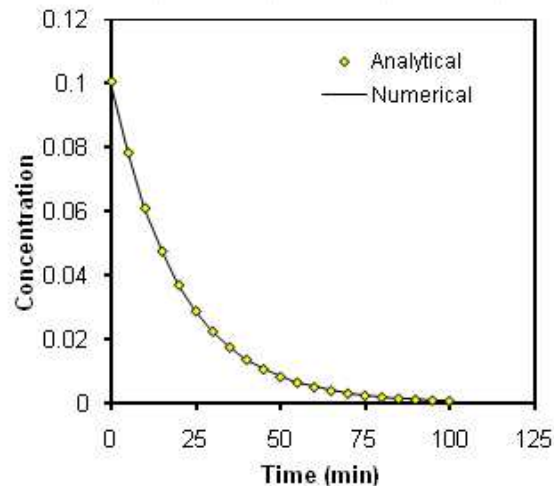
$C_0$ (M) =	0.1
$k$ ( $\text{min}^{-1}$ ) =	0.05

Numerical Constants

time step (min) =	0.02
endtime (min) =	100.0001
Print Interval (min) =	5
Print freq =	250
Total steps =	5000.005

This Value should be a whole number.

	Analytical		Numerical	
time (min)	C (M)	time (min)	C(M)	
0	0.10000	0	0.1	
5	0.07788	5	0.07787	
10	0.06065	10	0.06064	
15	0.04724	15	0.04722	
20	0.03679	20	0.03677	
25	0.02865	25	0.02863	
30	0.02231	30	0.02230	
35	0.01738	35	0.01736	
40	0.01353	40	0.01352	
45	0.01054	45	0.01053	
50	0.00821	50	0.00820	
55	0.00639	55	0.00638	
60	0.00498	60	0.00497	
65	0.00388	65	0.00387	
70	0.00302	70	0.00301	
75	0.00235	75	0.00235	
80	0.00183	80	0.00183	
85	0.00143	85	0.00142	
90	0.00111	90	0.00111	
95	0.00087	95	0.00086	
100	0.00067	100	0.00067	



Notes:

$(\text{Print Freq}) = (\text{Print Interval}) / dt$

"Print Freq" is the number of dt steps that occur before printing to the spreadsheet.

"Print Interval" is the time interval between the actual values printed to the spreadsheet.

Total Steps is the total number of times through the For/Next loop.

In the program, LC is a "Line Counter", as each printed value needs to be written to the next row (i.e., line) on the spreadsheet.

```

Sub decay()
Dim I, Co, k, endtime, dt, C, t As Double
Dim LC, PC, PInt, PFreq As Integer

Rem Kinetic Constants
Co = Cells(7, 4)
k = Cells(8, 4)

Rem Numerical Constants
t = 0#
C = Co
dt = Cells(7, 7)
endtime = Cells(8, 7)
PInt = Cells(9, 7)
PFreq = Int(PInt / dt) 'PInt is the Print Interval,
                       'that is: Print after this number of dt's

Rem Eulers Method
Cells(14, 5) = C 'write the initial values
Cells(14, 4) = t

LC = 1 'LC is a Line Counter
PC = 1 'PC is a Print Counter

For I = dt To endtime Step dt
  f1 = -k * C
  C = C + f1 * dt
  t = t + dt
  If (PC = PFreq) Then
    Cells(14 + LC, 4) = t
    Cells(14 + LC, 5) = C
    PC = 0
    LC = LC + 1
  End If
  PC = PC + 1
Next I

End Sub
  
```