

Using Gabriel Package under Microsoft Vista or Microsoft 7

Microsoft decided to change the entry point of activeX between the Operating System until Windows XP and Windows Vista (or) Seven. To overcome this problem one of the solutions is to use a virtual machine like Virtual PC, Virtual Box, VMware. The last one is commercial. Recently, Microsoft has made free Virtual PC and this is this one used in this tutorial¹. Some software of Gabriel Package runs directly on Vista or Seven. Try before installing Virtual PC². The procedure describe below is suitable for all version of Microsoft Windows until Vista ; Microsoft 7 users must install the Windows XP Mode and Windows Virtual PC.

1. Download the appropriate version of Virtual PC on one of many website³ (Virtual PC 2004 for Windows 2000 or XP, Virtual PC 2007 sp1 for XP or Vista).
2. Install Virtual PC.
3. Start Virtual PC.
4. A wizard will start:
5. Click Next.
6. Choose Create a Virtual Machine.
7. Click on Browse button and choose a expressive name for the virtual machine like W2K or XP.
8. Save.
9. Click Next
10. Select the desired Operating System (and see the default value) in the drop down menu: Windows 2000 or Windows XP.
11. Click Next.
12. For memory choose Use the recommended RAM value.
13. Click Next.
14. Choose A new virtual hard disk.
15. Click Next.
16. Keep all values (name and size) and when Click Next.
17. Click Finish.
18. If necessary run again Virtual PC.
19. Insert Windows Installation's CD.
20. In the windows console of virtual PC select your Virtual Machine and Click Start.
21. Normally the CD will start. If not you will have a message Running DHCP. Close this window and choose "Shut Down" and then run again from the console windows.
22. Installation occurs ... need long time. You have to enter some information for example the activation key. To help you in case of difficulties, the user can read many tutorial found on Internet.
23. After several restart, Windows is installed.
24. While the virtual machine is running press the Right Alt. key (hostkey).
25. Go to Action menu.
26. Choose Install or Update Virtual Machine Additions.
27. Click Continue.
28. Click Next.
29. Finish.

¹ But it seems that Virtual Box is easier to install and to use.

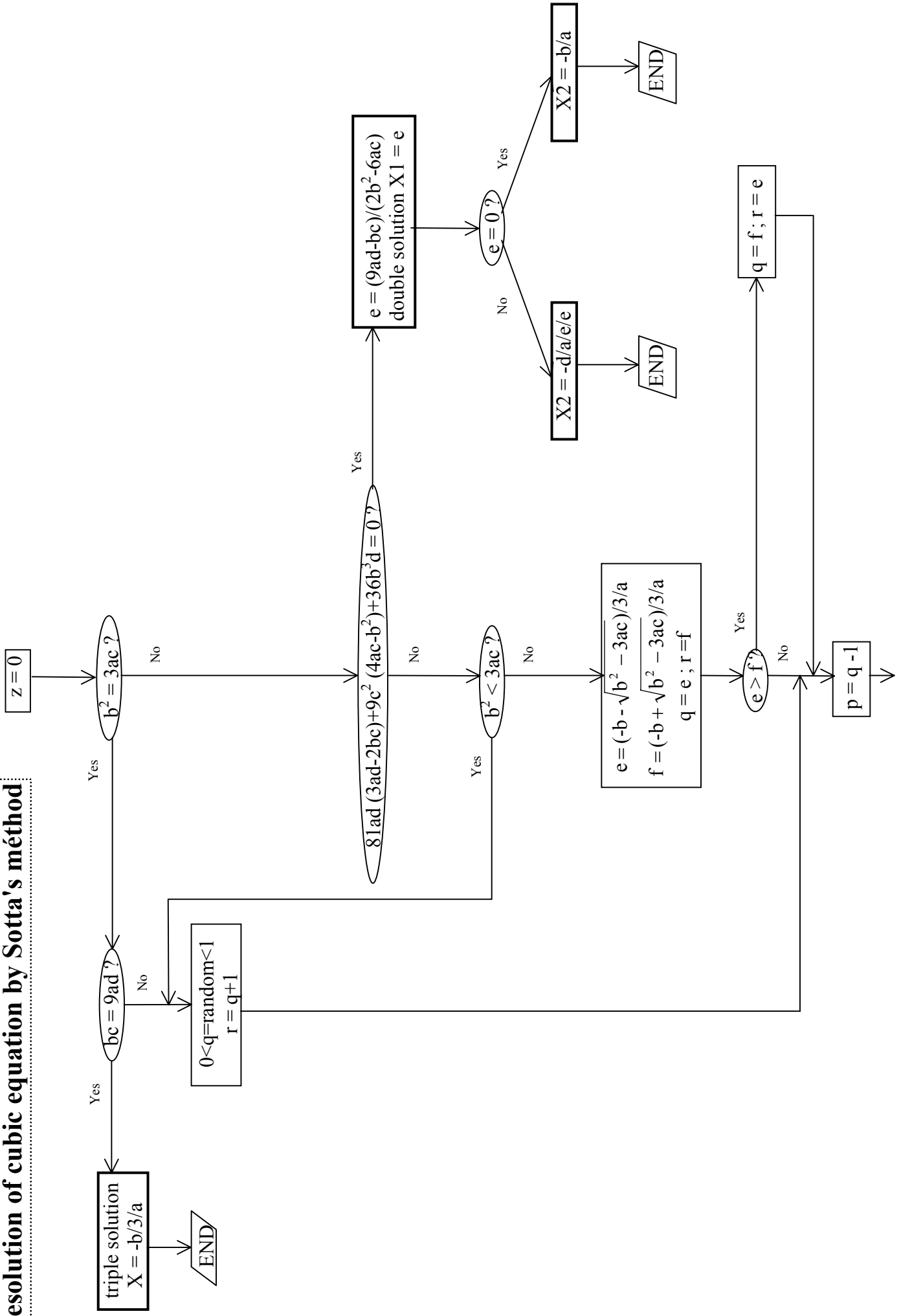
² Running under Vista and Seven: Gabriel Calculatrice Savon, Gabriel Nathalie II
Not running under Vista and Seven: Gabriel Data Analysis

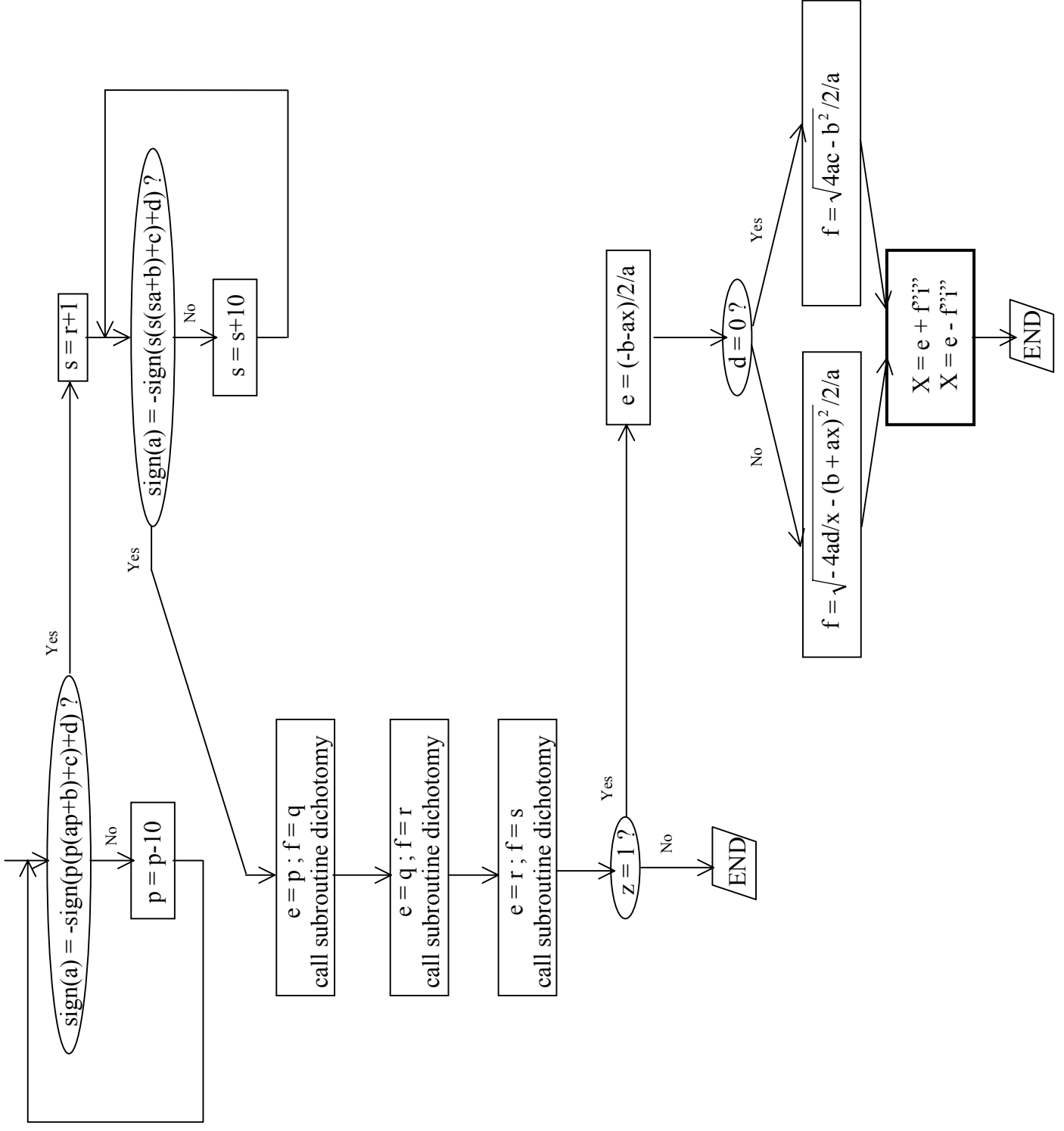
³ More information at: <http://www.microsoft.com/windows/virtual-pc/>

30. Choose Yes to restart the virtual machine.
31. Put the resolution of the screen at least to 1152 x 864 pixels true colors (32 bits).
32. On the host computer, create a folder with explicit name (like Shared with Virtual PC) and put in the install files of Gabriel Software desired.
33. While the virtual machine is running, go back to the console windows and click on Parameters.
34. Click OK.
35. Select Shared Folders in the left list.
36. Click in the right part Share Folder ...
37. Select the folder that you created before and give the Z for the drive letter for example (check share every time).
38. Click OK and you go back to the virtual machine.
39. Open My Computer and open Z network drives.
40. Runs Setup.exe and install the desired software.

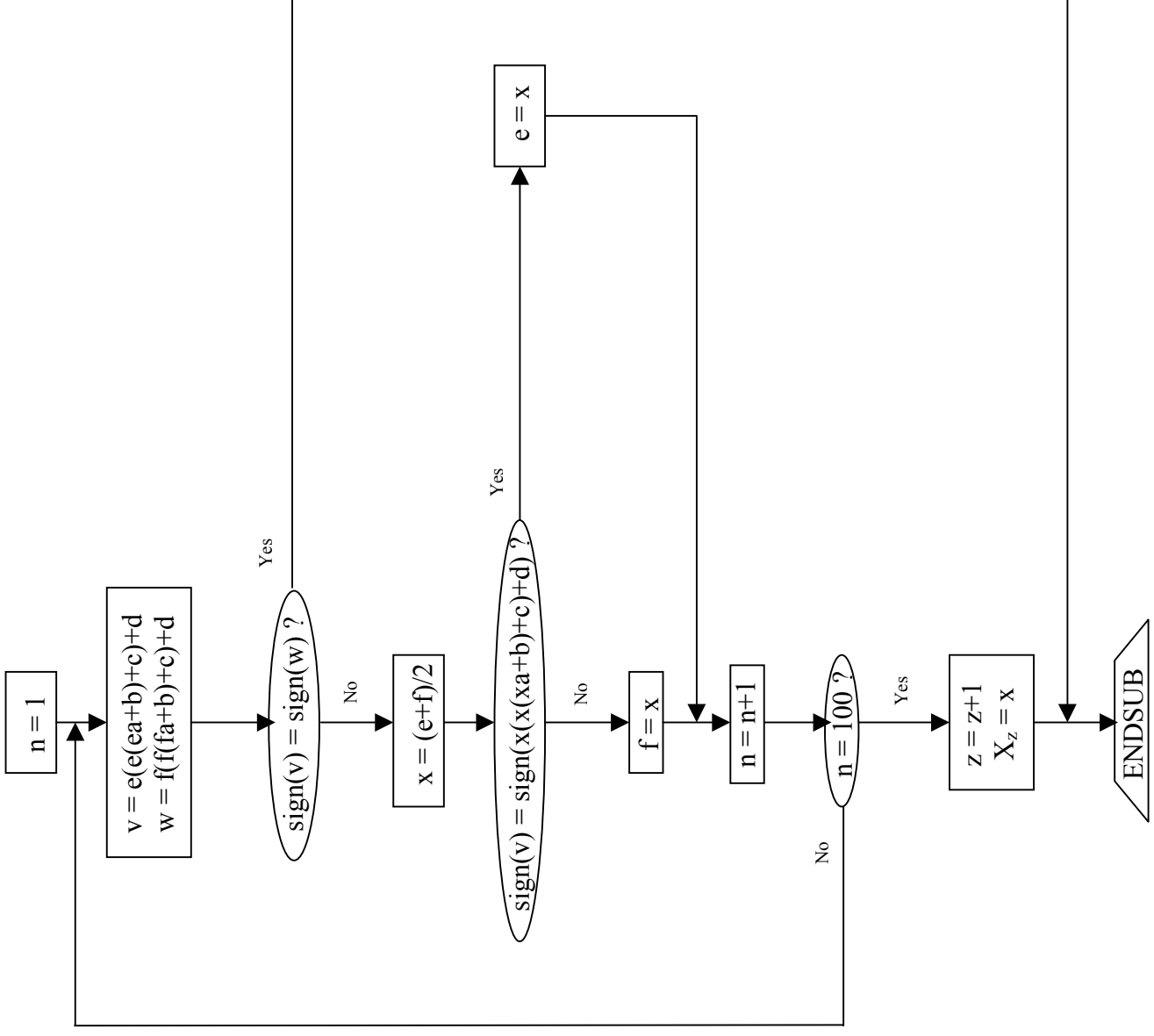
Enjoy with Gabriel Package.

Resolution of cubic equation by Sotta's method





subroutine dichotomy:



Equations used in the pH Analyze Module of Gabriel Data Analysis

C_A and C_B are respectively the concentration of the acid and the base. V_A and V_B are the volume of acid and of base. n means the number of moles.

Strong Acid by Strong Base

At the beginning

We have a Strong Acid.

$$\text{pH} = -\log [\text{H}_3\text{O}^+] \text{ and } [\text{H}_3\text{O}^+] = C_A$$

Between the neutralization (Strong Acid)

$$\text{pH} = -\log [\text{A}] \text{ and } [\text{A}] = \frac{C_A \cdot V_A - C_B \cdot V_B}{V_A + V_B}$$

At the neutralization (Strong Acid and Strong Base salt)

$$\text{pH} = 7. \text{ At this point } n_{\text{NaOH}} = n_{\text{HCl}}$$

After the neutralization (Strong Base)

$$\text{pH} = 14 + \log [\text{B}] \text{ and } [\text{B}] = \frac{C_B \cdot V_B - C_A \cdot V_A}{V_A + V_B}$$

weak acid by Strong Base

At the beginning

We have a weak acid.

$$\text{pH} = \frac{1}{2} (\text{pKa} - \log C_A)$$

Between the neutralization (buffer)

$$\text{pH} = \text{pKa} + \log ([B]/[A])$$

$$[B] = \frac{C_B \cdot V_B}{V_A + V_B}$$

$$[A] = \frac{C_A \cdot V_A - C_B \cdot V_B}{V_A + V_B}$$

If $C_B \cdot V_B = \frac{1}{2} C_A \cdot V_A$ then $\text{pH} = \text{pKa}$.

At the neutralization (weak acid and Strong Base salt)

$$\text{pH} = 7 + \frac{1}{2} (\text{pKa} + \log [B]) \text{ and } [B] = \frac{C_B \cdot V_B}{V_A + V_B} = \frac{C_A \cdot V_A}{V_A + V_B}$$

After the neutralization (Strong Base)

$$\text{pH} = 14 + \log [B] \text{ and } [B] = \frac{C_B \cdot V_B - C_A \cdot V_A}{V_A + V_B}$$

Strong Acid by weak base

At the beginning

We have a Strong Acid.

$$\text{pH} = -\log [\text{H}_3\text{O}^+] = [A] = C_A$$

Between the neutralization (Strong Acid)

$$\text{pH} = -\log [A] \text{ and } [A] = \frac{C_A \cdot V_A - C_B \cdot V_B}{V_A + V_B}$$

At the neutralization (Strong Acid and weak base salt)

$$\text{pH} = \frac{1}{2} (\text{pKa} - \log [A]) \text{ and } [A] = \frac{C_A \cdot V_A}{V_A + V_B} = \frac{C_B \cdot V_B}{V_A + V_B}$$

After the neutralization (buffer mixture $\text{NH}_4^+ \text{Cl}^- / \text{NH}_3$)

$$\text{pH} = \text{pKa}_2 + \log ([B_2]/[A_2])$$

$$[B_2] = \frac{C_{B_2} \cdot V_{B_2} - C_{A_1} \cdot V_{A_1}}{V_{A_1} + V_{B_2}}$$

$$[A_2] = \frac{C_{A_1} \cdot V_{A_1}}{V_{A_1} + V_{B_2}}$$

If $C_{B_2} \cdot V_{B_2} = 2 C_{A_1} \cdot V_{A_1}$ then $\text{pH} = \text{pKa}_2$

NB: ➤ C_{A_2} = Concentration of weak acid.

➤ C_{B_2} = Concentration of the conjugated weak base.

weak acid 1 by weak base 2

At the beginning

We have a weak acid.

$$\text{pH} = \frac{1}{2} (\text{pK}_{a1} - \log C_{A1}) \text{ and } C_{A1} = \frac{C_{A1} \cdot V_{A1}}{V_{A1}}$$

Between the neutralization (buffer of the acid)

$$\text{pH} = \text{pK}_a + \log \left(\frac{[\text{B1}]}{[\text{A1}]} \right)$$

$$[\text{B1}] = \frac{C_{B2} \cdot V_{B2}}{V_{A1} + V_{B2}}$$

$$[\text{A1}] = \frac{C_{A1} \cdot V_{A1} - C_{B2} \cdot V_{B2}}{V_{A1} + V_{B2}}$$

If $C_{B2} \cdot V_{B2} = \frac{1}{2} C_{A1} \cdot V_{A1}$ then $\text{pH} = \text{pK}_{a1}$.

At the neutralization (weak acid and null force base salt)

$$\text{pH} = \frac{1}{2} (\text{pK}_{a1} + \text{pK}_{a2})$$

After the neutralization (buffer of the base)

$$\text{pH} = \text{pK}_{a2} + \log \left(\frac{[\text{B2}]}{[\text{A2}]} \right)$$

$$[\text{B2}] = \frac{C_{B2} \cdot V_{B2} - C_{A1} \cdot V_{A1}}{V_{A1} + V_{B2}}$$

$$[\text{A2}] = \frac{C_{A1} \cdot V_{A1}}{V_{A1} + V_{B2}}$$

Strong Base by Strong Acid

At the beginning

We have a Strong Base.

$$\text{pH} = 14 + \log C_B.$$

Between the neutralization (Strong Base)

$$\text{pH} = 14 + \log [\text{B}] \text{ and } [\text{B}] = \frac{C_B \cdot V_B - C_A \cdot V_A}{V_A + V_B}$$

At the neutralization (Strong Base and Strong Acid salt)

$$\text{pH} = 7$$

After the neutralization (Strong Acid)

$$\text{pH} = -\log [\text{A}] \text{ and } [\text{A}] = \frac{C_A \cdot V_A - C_B \cdot V_B}{V_A + V_B}$$

weak Base by Strong Acid

At the beginning

We have a weak base.

$$\text{pH} = 7 + \frac{1}{2} (\text{pK}_a + \log C_B)$$

Between the neutralization (buffer)

$$\text{pH} = \text{pK}_a + \log ([B]/[A])$$

$$[A] = \frac{C_A \cdot V_A}{V_A + V_B}$$

$$[B] = \frac{C_B \cdot V_B - C_A \cdot V_A}{V_A + V_B}$$

At the neutralization (Strong Acid and weak base salt)

$$\text{pH} = \frac{1}{2} (\text{pK}_a + \log [A]) \text{ and } [A] = \frac{C_A \cdot V_A}{V_A + V_B} = \frac{C_B \cdot V_B}{V_A + V_B}$$

After the neutralization (Strong Acid)

$$\text{pH} = -\log [A] \text{ and } [A] = \frac{C_A \cdot V_A - C_B \cdot V_B}{V_A + V_B}$$

Strong Base by weak acid

At the beginning

We have a Strong Base.

$$\text{pH} = 14 + \log C_B$$

Between the neutralization (Strong Base)

$$\text{pH} = 14 + \log [B] \text{ and } [B] = \frac{C_B \cdot V_B - C_A \cdot V_A}{V_A + V_B}$$

At the neutralization (weak acid and Strong Base salt)

$$\text{pH} = 7 + \frac{1}{2} (\text{pK}_a + \log [A]) \text{ and } [A] = \frac{C_A \cdot V_A}{V_A + V_B} = \frac{C_B \cdot V_B}{V_A + V_B}$$

After the neutralization (buffer)

$$\text{pH} = \text{pK}_{a2} + \log ([B2]/[A2])$$

$$[A2] = \frac{C_{A2} \cdot V_{A2} - C_{B1} \cdot V_{B1}}{V_{A1} + V_{B2}}$$

$$[B2] = \frac{C_{B1} \cdot V_{B1}}{V_{A1} + V_{B2}}$$

- NB:
- C_{A2} = Concentration of the weak acid.
 - C_{B2} = Concentration of the conjugated weak base.