

Rotating Vectors and Sinusoidal Waveforms Tutorial Program

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Purpose: This program is useful for illustrating the concept of a rotating vector generating a sinusoidal waveform. Its main strength is that it uses animation to illustrate a topic that is very difficult to illustrate on a written page.

Synopsis: The Table of Contents screen shows the list of topics. By clicking on a topic and pressing OK the user jumps to the screens associated with that topic. In each topic there is generally discussion text on the right side of the screen and graphics on the left.

In the first 4 topics the student becomes familiar with the sin curve. This culminates with the user being shown step-by-step how to solve an equation of the form:

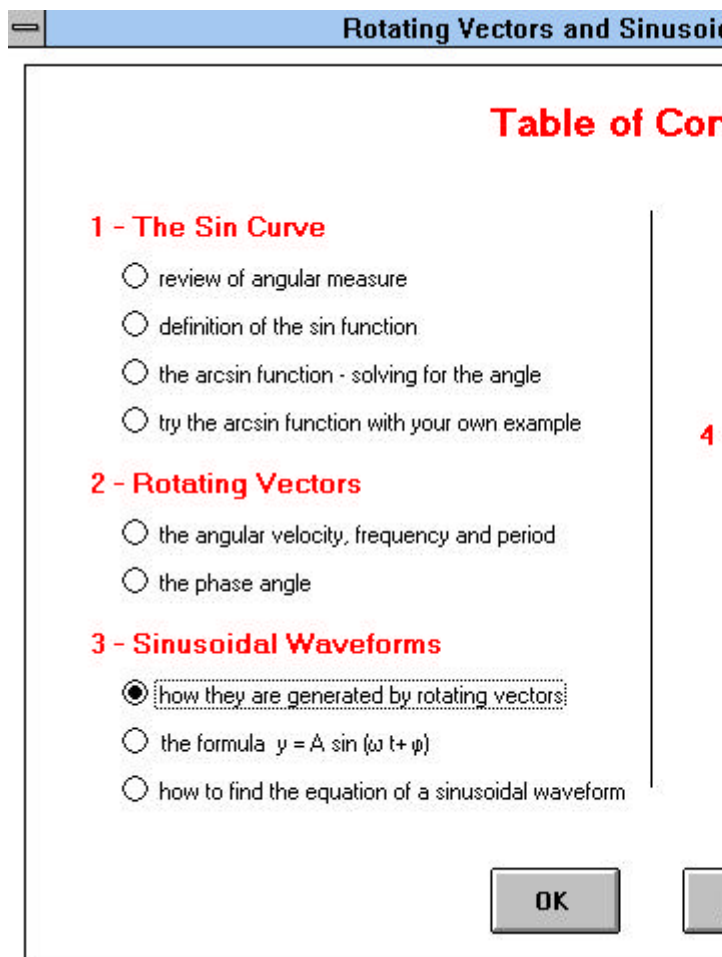
$$y = A \sin(\omega t + \varphi)$$

for all values of t (the user inputs the parameters A , ω and φ).

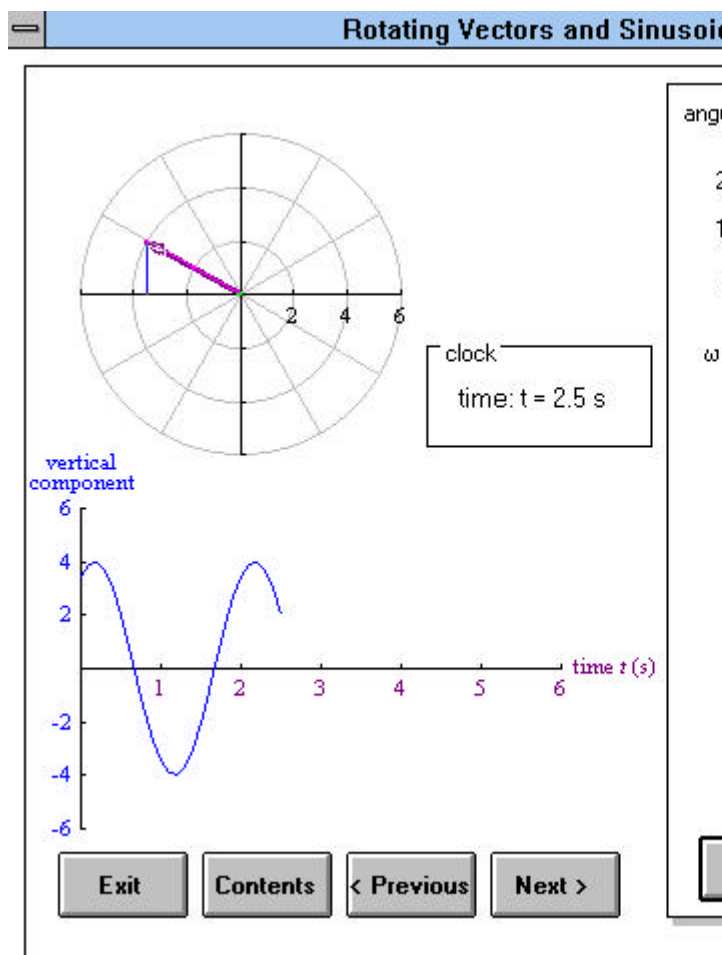
Then in part 2, via animation, rotating vectors and the concepts of angular velocity, length and phase angle are introduced.

In part 3 the waveforms corresponding to the rotating vectors are shown.

Finally, in part 4, various cases of the addition of sinusoidal waves (including Fourier series) are illustrated via animation.



Here is a screen from the topic highlighted in the Table of Contents above. By using the scroll bars the user sets the parameters A , ω and φ and then by clicking OK they start the clock. As the vector rotates in the circle at the top a sinusoidal waveform is generated in the graph below. A whole set of rotating vectors can be produced and then compared to understand the role of each of the parameters.



Downloading, Installing and Running the Rotating Vectors Program

Note that this software runs under Windows 3.1 or higher.

Step 1: Create a directory or folder, for example "MathBCIT", into which you can put the program.

Step 2: Put the files soft_03.exe and softreqd.exe into this directory.

[Click here](#) to download the self-extracting, compressed file soft_03.exe (size 76K).

[Click here](#) to download the self-extracting, compressed file softreqd.exe (size 369K).

(**Note:** The file softreqd.exe is required by several programs from this web site:

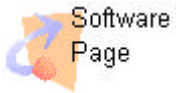
the Gaussian elimination program, the AC circuit analysis program, the DC circuit analysis program, the waveform tutorial program, the vector tutorial program and the complex calculator program

so you may already have downloaded it, **in which case you don't need to download it again.** Instead you can just copy it into this directory.)

Step 3: Find the files soft_03.exe and softreqd.exe using the Windows 3.1 file manager or the Windows 95 explorer. Double-click on each of the files to extract their contents. The program is now installed.

Soft_03.exe contains the Rotating Vectors and Sinusoidal Waveforms Tutorial Program.
Softreqd.exe contains several dynamic link libraries (DLL's) and Visual Basic Extensions (VBX's) that the Rotating Vectors program needs to run.

Step 4: To run the program find the file waveform.exe using the Windows 3.1 file manager or the Windows 95 explorer and double-click on it. You can also create a program item for it in Windows 3.1 or a shortcut for it in Windows 95. It has its own icon.



Send comments and suggestions to ehiob@bcit.bc.ca

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