E1 240

Visualization of abstract mathematical concepts

Mathematical concepts are considered as very abstract to a great extent. As a result of this, many people find it difficult to comprehend mathematics compared to other subjects. However, with the advancement of modern computer technology people have been successful i expanding the horizon of comprehending abstract mathematical concepts. In this sense, there is also large number of tools for the use by mathematicians. Most of them are expensive and non-affordable to many people.

We have been researching into developing low cost computer environment for comprehending abstract mathematical concepts at the university level. This is launched as a project related to improving the course materials prepared for the Open University students. The system for comprehending abstract mathematical concepts is developed using Visual C language, which can run on commonly used platforms. The system is aimed at graphical visualization of mathematical concepts such as continuity, differentiability, gradient, divergence and curl according to generalized - coordinate system. Some standard theorems, with regard to relations between line-integral, surface-integral and volume-integral, are also to be incorporated into the system, The system is designed to see these relations on the screen. User can also experiment by changing various paramenters and see how the behavior changes. The concepts of limits, differentiation and tangent are developed and tested. In view of the low cost involvement, the results were very encouraging, in particular, when it runs on a home PC. Expansion to the system incorporating additional features is in progress.