New Program for Construction of a Closed Curve Graph Using a Discrete Fourier Transform

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Current interdisciplinary project is aimed at expanding the horizons of high school students. Mathematical models, describing functions of time, are useful to solve practical problems in some areas of mathematics and computer science. Main goal of the project was to develop a program that can approximate any function of this type using a single algorithm. For the project the author had to consider the topics beyond the school curriculum, such as complex numbers and discrete Fourier transform. After theoretical preparation, a C++ code was developed. It is able to work with text files and also displays graphics on the screen using the GLFW library. Equations derived during theoretical preparation were used for the code. The result of the work is an efficient code for converting any closed two-dimensional curve into a sum of a certain number of vectors rotating with integer frequencies (functions of the form e^(2*pi*int)). Current model is applicable to any (such) curve, regardless of its complexity (length or presence of loops). Individual components of the resulting program ([e.g.] header files) could be used in any other projects related to complex numbers. The working application is currently not in the public domain; the program can be requested from the author of the work. The result of the project is able to encourage high school students to a deeper study of mathematics due to the beauty of images obtained.

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