

## Calculation and visualization of Fourier series with KeTCindy and KeTCindyJS

**Satoshi Yamashita**<sup>1</sup>, **José A. Vallejo**<sup>2</sup>, **Setsuo Takato**<sup>3</sup> [yamasita@kisarazu.ac.jp]

<sup>1</sup> Division of Natural Science, National Institute of Technology, Kisarazu College, Japan

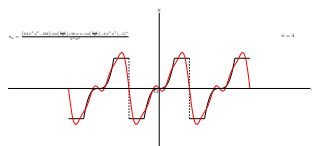
<sup>2</sup> Faculty of Science, State University of San Luis Potosí, México

<sup>3</sup> Faculty of Science, Toho University, Funabashi, Japan

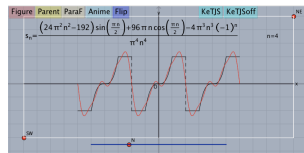
When teaching a course on Fourier analysis or its applications, as important as to learn how to compute Fourier coefficients, is to be able to understand the geometric meaning of finite Fourier series, and to get a feeling about their convergence to given periodic functions. In this contribution, we introduce a software-based tool to create visually appealing graphics and animations of Fourier series based on the use of KeTCindy and KeTCindyJS. KeTCindy is a plug-in for Cinderella2, originally developed as a kind of preprocessor of TeX graphical code systems such as tpic, pict2e and TikZ. Cinderella2 works as a graphical user interface of KeTCindy in such a way that one can create figures for TeX documents interactively and easily. Recently it has been enhanced in two ways: now it is able to call the CAS Maxima and to produce html files with the help of CindyJS. The combination of CindyJS and KeTCindy has originated the set of macros ‘KeTCindyJS’. We show examples of its use in Fourier analysis thanks to the following improvements to existing code:

1. The Maxima package ‘pdefourier.mac+’.
2. A function ‘Periodfun’ to translate function definitions to Maxima syntax.
3. A function ‘Ketcindyjsdata’ to embed the results from Maxima into html files generated by KeTCindyJS.

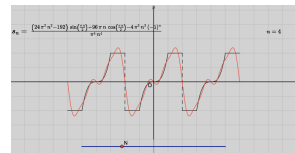
The following samples are downloadable from <https://sattch.github.io/>.



PDF



CindyScreen



KeTCindyJS

### Keywords

KeTCindy, KeTCindyJS, Cinderella2, CindyJS, Maxima, Fourier series