

# Visualization and Interface in Exploration of Functions

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## ABSTRACT

Studying of functions and their graphs is the most popular mathematics subject supported by computer programs. This role “are able to perform” the amateur programs, written by schoolboys, and the commercial products, specially created for studying mathematics or for application by professional engineers and mathematicians.

This paper presents analysis of typical lacks of existing software and offers few ways to overcome those, including features of visual modeling and interface support of adequate studying activities with correct models.

Evident examples of such shortage provide incorrect graphing of functions with finite and/or removable discontinuities, absence or weak support of functional correspondence visualization in multivariate cases. The fundamental activities of domain element’s image and range element’s preimage finding, being initial acts of correspondence recognition, need appropriate software maintenance.

Findings of equation’s roots and function’s zeroes are just definite cases of the function’s preimage finding task. We discuss and present different ways of modeling and interface support of these activities in Calculus, Complex Analysis and Linear Algebra studies.

Proposed solutions are illustrated by pilot version of the author’s program “VisuMatica”.

## Keywords

Visualization, interface, function, model, activity, image, preimage