



Using GeoGebra in Teaching Calculus

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Abstract

Beside the applications in Geometry, the dynamical interactivity of the two windows, the Geometry and Algebra windows of GeoGebra [1] makes it extremely suitable for the applications in teaching Analysis. One can easily visualize the pointwise correspondence between the points of the domain and codomain of the function, to study compound functions. Using the animation, a function which is built in the slider – an extremely useful function of the software – one can study the transforms of the elementary function, the role of each parameter separately, and even their compound action. Special functions (see the respective section in the MacTutor History of Mathematics at [2]) can be studied and represented in a suitable form, especially the so called “technical curves”, those used in engineering, altogether with their associated curves (evolute, involute, inverse, pedal curve etc.) It can be compared the power of GeoGebra and Maple in analyzing the pair of compound functions $\sin(\arcsin(x))$, and $\arcsin(\sin(x))$ too. Parametric and polar coordinate functions - beside using the built-in commands - can be obtained as the trace of the point moving along the curve. This way is maybe closer to the technical properties of these curves, than the classical way of representing them.

Further commands, like derivatives, lower and upper sum, Taylor polynomials are useful in teaching basic notions.