

Introducing Calculus without limits

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Abstract

The present lecture is aimed at popularizing one of the most interesting innovations of Prof. Yaroslav Tagamlitzki in teaching Calculus, called Efodics after a method of Archimedes. Its most important feature is that no standard limiting processes, or infinitesimals, are involved. It is based on the notion of "normal functions" which are easily seen to belong to the Lipschitz class. Almost all functions which are essential for an undergraduate Calculus and even for starters graduate courses, belong to this class, as e.g. the polynomial, rational, exponential, logarithmic, trigonometric, etc. In his lectures designed for freshmen Y. T. was used to teach the most essential results of Calculus for this class of functions. Thanks to this approach, the students were able to dive from the very first months of their study into work with differentiation, integration, and analysis of curves, including the notions of monotonicity and concavity.